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INFLAMMATORY CYSTS AND CANCER OF THE BREAST

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FOR many years discussions have centred around the question of the association of cancer to inflammation, and from the various viewpoints of the subject there have developed many outspoken opinions and some theories. By some it has been shown, and to themselves conclusively proved, that inflammation was an important aetiological factor in the production of cancer, others found that all gradations could be observed between chronic inflammatory reactions and beginning cancers; while some again believed the inflammation to be only a coincident reaction in the cancerous process. The substance of each of these views has been expressed in the early history of scientific medicine, and since then there has been a constant reiteration of the same opinions; but we must admit that only recently has any satisfactory demonstration of a relationship been forthcoming. Even much of the evidence of this association which is offered to-day must be discarded.

In an excellent paper, in 1877, Friedlander discusses the occurrence of a typical epithelial growth, both in connexion with inflammation and with cancer. His observations show that the healing process of many epithelial structures is accompanied by proliferative changes which, as processes, are atypical, and in which, too, atypical cells are found. The skinning over of indolent ulcers gives rise to unusual activity on the part of the surrounding epithelium. Active mitosis leads to a thin film of epithelial cells which stretch inwards from the border, while larger islands of epithelial cells appear at some distance from the margin. In each of these areas the epithelial cells have taken on an unusual tendency

to grow, and although a few columns of cells may be found dipping into the granulation tissue, the tendency is for the growth to remain on the surface. In this temporary, new rôle of activity, the epithelial cells alter their appearance very much. It is observed that the cells show little tendency to keratinize, they are more protoplasmic, and are easily distorted by local pressure, while irregular nuclear figures are occasionally found. Similar changes may be observed in chronic fistulæ opening on epithelial surfaces. The epithelial cells surrounding the areas of chronic inflammation are stimulated to activity and tend to reproduce their structures as nearly as possible. Other examples of this reaction to inflammation on the part of the epithelium, are found in lupus, ulcers from repeated burns, focal formalin dermatitis, *x*-ray burns, and varicose ulcers.

Each of these lesions has a common process, a reaction of epithelial cells to an inflammatory condition in a neighbouring tissue, but itself not an inflammation.

In viewing the causes contributing to the vegetative activity of the epithelial cells, several points stand out quite prominently. Tissues of all kinds are subservient to their vascular supply, and to the nutrient materials brought to them. There is a definite balance in which the functional activity of the cell and the energy supplied through the nutriment equalize each other. When this balance is arrived at, life in the cell may go on merrily, and without nervous control. With, however, the varying demands put upon a tissue, or upon the vascular source of supply, this balance is not easily maintained, and it is here that a nervous mechanism in reacting upon one or the other is required. Further, it is well to view the activity of the cell in the terms of energy available. Given that a certain cell has a definite amount of energy, we find that it may expend this in two ways. A certain amount of energy is required to carry on the metabolism of the particular cell, that it may functionate in its proper capacity in the general economy of the body. Another amount of energy is necessary to permit the cell to bring about a reproduction of its own kind, when such is necessary. We are familiar with the fact that the latter, the energy for vegetative activity, is very great in embryonic life, so that the cell has little or no energy left to carry on function; while, on the other hand, in adult life, the vegetative activity of the cells is almost at a standstill, and almost all the energy is devoted to the carrying out of the specific function of the cell. What forces direct the cell to expend its energy in one way or the other is not quite clear. Still,

we have certain facts which indicate some of the causes which alter the activities of vital protoplasm. Broadly speaking, influences which alter the activities of cells, we call stimuli; and the important stimulus quickening the cells in processes of reproduction, is commonly some form of inflammation. Now it may not be that the reaction of inflammation in itself causes cells to multiply; but the combined forces, including the initial agent bringing on the inflammation, as well as the stimuli which develop during the course of the inflammatory process, each tend to irritate the surrounding cells to activity. These new stimuli consist mainly of chemical compounds, probably the products of cell disintegration.

The above conception is similar to that expressed by von Hansemann in anaplasia. Von Hansemann's hypothesis indicates that by some means certain cells have suffered modification, so that they no longer possess the differentiation exhibited by the mature tissue from which they were derived, but have acquired, or reverted to, a blastocytic type with increased powers of growth. In other words, von Hansemann gives us a statement as to the nature of cancer cells, but offers no explanation for the cause.

Ross has claimed that by using some of the decomposition products of cells he could increase the activity of the leucocytes, as well as that of the fixed tissue cells. He has observed the greater rapidity of growth of cells in chronic ulcers when these regions are powdered with "globin" or its products of decomposition.

In the closer study of the chemistry and structure of cells, it has been amply proved that the nucleus of the cell is the dominant structure, and that the initial activity for work is developed in this structure. It is through the vegetative activity of the nucleus that cells are caused to multiply. It may be even more, the chemical syntheses of cell metabolism, as Adami has pointed out, are probably entirely dominated by the nucleus. If this be true, then the condition which we commonly refer to as the selective action of the tissues, is a property of the nucleus. If the nucleus, by nature of its metabolic activity, has the property of being selective in its chemical reactions, and if it is on account of the adaptability of the nucleus that the tissues may accommodate themselves to varying conditions in the fluids which nourish the cell, then, too, disturbances which are effected within the cell structure will be first and most marked in the nuclear material. Our micro-chemical methods are quite inadequate to give any suggestion of the early action of deleterious influences which have the effect of altering the chemical architecture of the nucleus. It is only in the later stages, when a tissue has taken

on, or at least has given evidence of, what we have come to recognize as true malignancy, that we observe an atypical structure in the nucleus. Von Hansemann has shown that the cells of human cancer are subject to a diminution in the number of chromatin filaments in the mitotic figures. Later, Farmer, Moore, and Walker observed an analogy between the mitoses of the reproductive cells and those of cancer cells. They believed that a fusion of an epithelial cell with another, possibly a leucocyte, would produce hybrid daughter cells with atypical neoplastic qualities. Bashford and Murray have also studied atypical nuclear divisions. They do not agree with Farmer, Moore, and Walker, but believe that the irregular numbers of chromosomes, sometimes more, at other times less, than the numbers of chromosomes in somatic cells, result from abnormalities in the splitting of the filaments or in the unequal attraction or faulty position of the centrosomes.

These observations indicate that when certain influences are present, or it may be are removed, the vegetative activity of the nucleus is exaggerated; and that one of the objective signs is the atypical arrangement of the chromosome filaments. It is a not infrequent observation to find one or more nuclear figures in gland cells in the neighbourhood of inflammatory reactions. The majority of the cells divide by typical karyokinesis. However, the atypical variety—at least atypical from the viewpoint of the size, shape, arrangement, and number of chromosomes—is also met with in inflammatory processes. Some of these examples of atypical "figures" are, we must admit, possible artefacts; there remain, however, some which have the semblance of true atypical mitoses. The point which is of direct interest is that we have in the reaction of tissues to certain irritants, alterations in the structure of cells which simulate closely those changes observed in malignancy.

Some observers have indicated that the direction of the mitoses of epithelial cells differs in malignant neoplasms from those occurring normally or in benign processes. Under normal conditions the growing cells standing upon a basement membrane are found to have the mitotic figures placed at right angles to the layer, while in malignant new growths this arrangement is not preserved. We have, however, repeatedly observed that the lack of regularity in the division of the nuclei is not confined to cancers, but may also be found in benign growths and in inflammatory states.

Of recent years we have had a closer study of known irritants which bring about atypical tissue proliferation. Workmen engaged in aniline industries have not infrequently kidney diseases and

bladder irritation. The latter condition varies from a slight superficial inflammation to actual proliferative vegetations upon the bladder mucosa. A chronic cystitis precedes tumour development. Among those who have been engaged in this work over extended periods—ten years or more—the presence of papillary tumours is not uncommon, and the literature contains reports of some forty-five cases. The early stages of papillary tumours of the bladder are notoriously difficult to diagnose as to their malignant qualities, but of these semi-experimental cases in aniline workers, over three-fourths of the total number of tumours were observed to possess malignant features.

Equally important are the reports of papillary tumours of the bladder developing in those infected by the bilharzia. Egypt gives us the greatest number of these cases. The accumulated evidence of the association of bilharzia disease with new growths of the bladder is undeniable, and similar to the type of tumour in aniline workers, the malignant tendency is great. Goebel, after a careful and extensive study of bilharzia neoplasms, concluded that about fifty per cent. were malignant.

Ferguson has further collected forty cases of primary, malignant disease of the bladder associated with bilharziosis. He has had an excellent opportunity of studying all grades of bilharzia infection. In several cases of bilharzia of the bladder, the surface epithelium was increased in thickness, and columns or cylinders of the epithelium, continuous with the surface, extended into the connective tissues in the region of the inflammatory reaction. Various grades of this proliferative change were to be observed according to the severity and length of time of the infection. Ferguson states that he has "no hesitation in affirming that cancer of the urinary bladder is the irritation cancer of Egypt." These new growths produce metastases.

Recently Wolbach has discussed tumours in their association with repeated injuries. Among the many instances of the clinical relation of tumour to injuries received, he reports from his own experience the development of cancer of the skin to *x*-ray burns. These neoplasms, he says, constitute the first experimental cancers. The results of his studies showed that the chief effects of *x*-ray exposures were upon the tissues of the skin, connective and smooth muscle tissue, and endothelium. There is a repeated destruction and repair of the tissues following the exposure, and finally obliterative changes develop in the blood vessels which lead to nutritional disturbances. Wolbach believes that these nutritional changes are

important factors in the subsequent development of cancer, and that the direct action of the rays does not lead to the tumour growth. There appears to be a "latent period" of several years between the time when the individual received *x*-ray treatment and the time of development of the new growth. The constant and severe changes existing over this period, in the deeper tissues, have a marked effect upon the epidermis, and are probably responsible for the acquisition of the new properties on the part of the epithelium. The progressive character of the skin lesions, from the earliest hyperemia to a definite cancerous growth, indicates the close relation of tumour to repeated injuries.

Quite striking were the results of B. Fischer, who was able to induce atypical epithelial proliferation by the subcutaneous inoculation of Scharlach R. dissolved in olive oil. The proliferative reaction of the overlying epithelium, sending large columns of cells into the underlying corium, was interpreted by Fischer as an attraction, or attractive force, on the part of the Scharlach R. for epithelial tissue. This special attractive force he called attraxin. The connective tissues react by a process of an acute aseptic inflammation. The study of the epithelial reaction is interesting. Mitotic figures are seen, cells of irregular size and shape are present, and epithelial pearls are not infrequent. Depending upon the depth to which the fluid is injected, one obtains an extension of the proliferation into the deep tissues. At times the new growth forms quite a mass, projecting above the surface like a diffuse wart. Metastases have never developed from these experimental proliferative masses, and the newly developed tissues always regress and tend to assume the normal as soon as the foreign materials inoculated have been absorbed and have disappeared from the local site.

Borrel reports the frequent occurrence of cancer of the skin in association with chronic lesions caused by the demodex folliculorum.

Thus the majority of observations on the association of inflammatory states with subsequent malignant growth, have been made upon skin and mucosal surfaces, but evidence is not lacking that an equally important association may be observed in glandular organs. We are familiar with the reactions in the glandular tissues of the liver in cirrhoses, and it has also been pointed out that the adenomata and primary cancers of the liver are associated with fibroses of this organ.

From the practical standpoint, the changes occurring in glandular and other tissues, as the result of chronic irritation, or it may be even of conditions having some of the ear-marks of inflam-

mation, lead to the greatest difficulty in recognizing the beginnings of cancerous processes. No longer can we trust naked eye appearance, and much less does the size of the mass give us any clue as to the invasive characters of the aberrant tissues.

I have been particularly interested in the histological characters of nodular masses present in the breast tissue, and in the similarity in the appearance of some truly inflammatory reactions to those which have been demonstrated in metastases to have malignant qualities. There would appear, when one arranges a series of such specimens, to be a direct transition, in histological appearance at least, from the one with simple inflammation to the other having malignant qualities.

The reactions occurring in the breast tissue under the influence of irritants are to be observed both as to the changes in the stroma and to the effects upon the glandular epithelium. Particularly are those reactions which are of a chronic nature more important in the study of the comparative changes in inflammation and cancer, than those processes which are of a more acute nature. In the acute conditions, the reactions take place in the supporting connective tissues, where either the destruction of this tissue along with its contained glandular elements takes place, or, if the reaction is less severe, the affected areas are flooded by the inflammatory exudate. During these processes of acute reaction there is usually some attempt on the part of the fixed connective tissues and their functional gland structures to react, either in an increase of their normal secreting function or in some attempt to increase the tissue mass by proliferation. It is, however, more commonly found that in such acute inflammatory disturbances, where the causative agent is not sufficiently severe to lead to tissue destruction, the reaction in the glandular structures is commonly that of increased function or exfoliation of the lining cells. On the other hand, the reaction in the connective tissues is usually more pronounced, at least in its microscopic character, depending upon the intensity of the irritant. Those which interest us the most, have but little tissue destruction, but the tissues, besides showing the presence of exudates, also exhibit an increased activity in the fixed tissues themselves. This proliferation is mainly in the fibroblasts, and to some extent in the endothelial cells.

As we pass from the acute to the more chronic types of inflammation, the changes in the connective tissue are evidenced mainly in the increase of a firm fibrous tissue with a greater or less infiltration of lymphocytes surrounding the vessels and gland structures.

It is more particularly in this type of inflammation that our interests centre, as in it the changes become more evident in the epithelial tissue. Whereas little evidence of active proliferation is seen in the stroma, the tissue being almost entirely composed of adult connective tissue cells, there is not infrequently a great reaction present in the gland structures. The study of such inflammatory reactions includes the study of that large group of cases variously described as chronic interstitial mastitis, fibrosis of breast and fibrocystic disease of the mamma. In all of these there is the one common condition, that of fibrosis. In some cases the fibrous tissue is localized in nodules, in others it pervades the breast diffusely. The breast itself is harder than usual, and may feel nodular, or it may have a single firm mass directly beneath the nipple. At times, also, the condition follows the direction of the lymphatics, so that two or more nodular masses arrange themselves in a row from the region of the nipple in the direction of the axilla.

Our knowledge of inflammatory processes suggests in these cases a preceding acute inflammation, although the history of such is not always obtainable. It is to be observed that the inflammatory processes to be noted in the stroma are, in their spread, closely associated with the lymphatics surrounding the gland structures. Thus it is found, that in the periphery of the diffuse inflammatory reaction the outer borders show the main reaction about the gland structures. Occasionally, too, in chronic forms of the disease the main inflammatory process is to be observed in similar areas, and all gradations between the acute inflammation and fibrosis is present about the gland structures in different parts of the breast.

While some of the fibroid processes of the breast are isolated to nodular masses involving the glandular part of the organ, other cases show a diffuse process, in which the greater part of the breast tissue becomes indurated. Not uncommonly these changes develop at a time when the breast becomes more adipose and pendulous, so that the fibrosis is associated with the deposition of heavy layers of fat.

The point of importance, however, is that the fibroid changes take place about the glands and their ducts, and by direct mechanical interference still further impede the functional activity of the glands. Whereas the activity of these glands for the most part ceases with the menopause, their structure is well maintained for some time. A certain amount of secretory activity continues all through life—a physiological necessity—for all tissues must functionate to maintain a healthy equilibrium. Adequate nutriment is

supplied to the tissues equal to the requirements of their work. When, however, by an external process the functional work of these cells is interfered with, they have a potential excess of available energy.

Not only does the fibroid change lead to stasis of the mammary secretion along with the development of cysts, but the very condition which has induced the process of fibrosis has, simultaneously, had an effect upon the character of the epithelial tissues. The gland structures are still further altered by the change of their environment, the metamorphosis of a vascular stroma to one of less activity and poor in its nourishment. The development of sclerosis of the vessels is a not infrequent feature which may have a bearing similar to that observed by Wolbach in the skin.

The association of chronic interstitial mastitis with cysts has previously been commented upon by Schimmelbusch, Koenig, Roloff, and others, so that we need hardly touch upon it here. It was noted that the condition was usually bilateral, and commonly extended diffusely through the breast tissue. The interstitial proliferative changes in the connective tissues are primary. The epithelium lining the cysts, which is the epithelium of the gland tissues of the breast, does not show a uniform character in all cases. In some it remains only passive—simply acting as a lining layer to the cyst, and becoming more stretched as the cyst becomes more widely distended. In other instances, however, reactive changes occur, so that instead of remaining as a single layer of epithelium, proliferative changes develop which entirely alter the histological picture as well as disturb the relation of the epithelium to its underlying supporting stroma.

It is of interest to study these epithelial reactions more closely. Of these we find two distinct types which can be recognized only by the microscope. On the one hand, there are cases in which the lining membrane not only clothes the dilated cavities, but in which papillomatous outgrowths develop with typical finger-like processes. These papillomata project into the cyst and consist of an overgrowth of the structures of the entire cyst wall. The stroma projects from the submucosa and ramifies into many processes, each being typically lined by a single layer of cubical cells. It would appear that the cyst wall itself has been stimulated to overgrowth. The epithelial cells are nourished by the vascular loops which ascend in the stroma of the papilloma. The development of these aberrant structures may be compared with the development of papillomata on other epithelial lined membranes.

Quite different, however, is the structure of the second form of epithelial overgrowth. In it we observe the proliferation of epithelial cells alone. There is no supporting stroma, and although large masses of epithelial cells gradually fill in the lumen, there are no nourishing blood vessels which accompany the growth of the epithelial cells. The growth of the cells is more or less concentric and inward, but the core of the epithelial cells may extend in either direction along the lumen of the tube. The activity of the growing cells may be observed in the rather frequent mitoses.

In this second form of epithelial growth, then, we are dealing with a proliferation of the lining cells, in which a proper relation of the epithelial cells to the stroma is no longer maintained. The structure is atypical and proliferation is active. Moreover, there is no longer a single growing layer standing upon a basement membrane, but proliferating cells are found everywhere in the new mass. These conditions, particularly, give us difficulty in determining the presence or absence of malignant qualities.

Schimmelbusch concluded that all forms of such epithelial overgrowth must be classified among the neoplasms. He regards them as developing sui generis, and applies the name adenoma mammæ. He, however, overlooks the fact that the condition is preceded by a low grade inflammatory reaction and cyst formation, and that all the cysts do not react in this manner. Moreover, as we have pointed out above, epithelial tissues do react to irritants, and these reactions vary according to the stimulus present. One other form of fibrosis of the breast must not be overlooked. I refer to the apparently spontaneous fibrosis which is so prone to involve the glandular elements and yet does not appear to be associated with an inflammatory reaction. I would not say, however, that an irritant or stimulus in some form was not present.

If, now, for a moment, we turn our attention to the growth of cells in general, we may offer some grounds for suggesting the close resemblance of these cell masses, stimulated to activity by irritants and inflammation, with those of malignant new growths. Our conception of the requirements of cells for their passive existence, as well as for growth, has been clouded by the teaching that a certain relationship must exist between the growing tissue and the blood supply for adequate nourishment. What an adequate nourishment consists of has never been defined. Quite recently, however, through the work of Harrison, Carrel, and Burrows, and more recently of Weil of our laboratory, it has been shown that the tissues of warm blooded animals, including mammalia, may be

nourished and grown on diverse media. Plasma, serum, Ringer's solution, and Locke's solution, all serve as suitable media in which almost every tissue of the body may be grown. Connective tissue, heart muscle, liver, kidney, spleen, and skin have each been grown in our laboratory. The question, then, of tissue growth presents itself in a new light. We no longer throw the shroud of mystery around the processes of the so-called spontaneous growth. We may view it as a proved fact that our body cells live and multiply with great ease and that the quality of the nourishment is not special for each tissue, as was once held. This statement is, however, only true in the consideration of the needs for the vegetative activity of the cells. For special functions of tissues special food is no doubt required.

Applying these considerations to the proliferative processes of the breast, it is evident that the factors for the growth of the epithelial cells are present. The initial stimulus or influence acting upon the cells is received during the inflammatory reaction, which occurs in the interstitial tissue. With the development of the cyst cavities, a type of fluid accumulates which is an adequate nourishment for the growth of cells. What difference there is in the type of stimulus—the one which induces papillomatous overgrowth with stroma, and the other in which the epithelial cells alone react in proliferation—we cannot say.

From a general study of tissue reaction, it would appear that the character of the tissue growth is dependent upon the nature of the stimulus, the change in the nourishment, and the state of the cells acted upon. How one irritant differs from another in its effect is difficult to say—but it also must be conceded that the same stimulus, under different conditions, has widely different effects. Dr. Haythorn, of our laboratory, has been able to show that subacute and chronic inflammatory processes may at times lead to metaplasia of the bronchial mucosa, and that in this process the stimulus acts upon the growing cells, so altering their characters that a histological metaplasia results. However, the changes in metaplasia are not alone confined to histological characters. The entire nature of the cells may become modified so that the vegetative qualities are also altered. This we believe happens in the proliferating cysts which we have described. Moreover, the degree to which this metaplasia may be carried is very variable, so that all proliferating epithelial masses differ from each other quantitatively in the changes produced. I use the word metaplasia in the broader sense, and do not confine its meaning or interpretation to that as

defined by Virchow. In metaplasia I see not only a change in the form and appearance of a cell, but also consider changes in the internal architecture of the nucleus and cystoplasm, as well as an alteration in the physiological function of the cells. These latter aberrations may be great or small—and in fact cannot be accurately determined by present methods. Nevertheless, these slight metamorphoses have an important bearing upon cell relationship in the tissues where they occur.

It is obvious that all living matter is influenced by its environment. Our body cells are just as impressionable masses, to external influences, as are the more lowly organisms, particularly bacteria. New qualities may be acquired, and where once accepted are firmly impressed.

In the study of seventy-five cases of breast conditions of various kinds, I have been able to observe transitional changes from the simple, smooth lined cysts to those in which the epithelial proliferation indicated malignancy with metastasis. Although the distinct types of these processes which stand at either end of the series are clear cut and offer no difficulty as to the extent of their variations from the normal, I have found processes in which a conclusive diagnosis was impossible. Some of the instances of epithelial metaplasia, which may not at the time of examination indicate the crucial qualities of malignancy in metastasis, nevertheless possess features which we have learned to respect and to fear, lest in the future they should acquire this character. It may be that the forces acting upon the epithelial cells have carried the process of metaplasia to only a certain degree, and that these partly altered cells remain in a latent or semi-functional state until the advent of other new stimuli which bring about their complete metamorphosis. Latency of tissue in this sense is to be distinguished from the latency of the vitality or life of cells as has been discussed by Carrel.

Up to the present no one has been able to observe the beginning of a cancer. We have, however, had an opportunity of studying an unusually early cancer of the breast. The entire mass, which was only discovered by accident, was only half a centimetre in diameter, or about the size of a pea. Microscopically all the characters of malignancy were present, but there was no clinical verification of this diagnosis. However, this small mass showed evidence of destructive infiltration, the development of islands of proliferating epithelial cells with both typical and atypical mitoses. In a few places the proliferative changes did not differ from the type of epithelial proliferation which is found in cysts in which the stroma

does not react. These latter areas, moreover, did not show evidence of a destructive invasion, and the basement membrane remained intact. It did appear that these areas were in the stage of transition in which the epithelial cells had acquired some new qualities, but were not completely metamorphosed. Moreover, many of the gland structures in this cancer were in a process of metaplasia—if we may so call it—in which several portions of normal glands were simultaneously taking on new characters. In other words, it did not appear that the growth had arisen from a single cell, but from a mass of cells which had been similarly influenced. Moreover, the incomplete changes which had occurred in the outlying parts of the growth did not differ in their appearance from epithelial changes observed in benign cysts of other breasts.

In this conception, then, the Cohnheim theory of embryonal cell rests is unnecessary in explaining some breast cancers. Further, a metaplasia of epithelial tissue, giving it malignant quantities, may occur *in situ* in gland structures without having a mechanical or vegetative displacement as suggested by Ribbert.

Cysts of the breast with reactive proliferative changes in the epithelial lining stand in an intermediate position between true inflammatory processes and cancer. Those cysts in which the epithelium alone shows vegetative activities have many features in common with true neoplasms, and must be viewed with grave suspicion.

Evidence, therefore, indicating a relationship between inflammation or irritative processes of tissues, to cancerous conditions, are not wanting either from clinical or microscopical sources. As we have then come to accept these observations and interpretations as facts, we must also be willing to appreciate the difficulties which must arise in those borderland conditions which, having obvious inflammatory or reactive changes, also have some of the characters of early malignancy.

At the present time in the practical crusade against cancer by the surgeon, the early diagnosis of the process is most important. Radical operation is still the important measure of success. It has come, therefore, that the former stereotyped points for clinical diagnosis of cancer are almost valueless in coming to a conclusion whether a tissue has benign or malignant qualities. The most satisfactory evidence, although not always conclusive, is gained by the examination of the tissue after removal, both by macroscopic and microscopic means. Nevertheless this technical procedure must be preceded by the collection of all possible clinical

data. The differential diagnosis of any given case must rest in the hands of the clinician, who obtains additional information upon the case from all the allied departments of medicine. In the hope of early diagnosis, every means must be sought to give assistance in the better understanding of the disease process, for we have learned that our hopes in cancer are in the early removal, before the malignant character of the growth has become dominant in diverse parts of the body.

The surgeon has for years been insisting upon the sending of cases with malignant neoplasms to him early, and although much has been done in this direction, we have to-day reached a point where it is quite impossible to make an early diagnosis by clinical means alone. Small tumorous masses are often observed by the practitioner, but in this early stage even the keenest observer would hesitate to give a conclusive answer to the question of malignancy. Fischer-Defoy points out that out present attitude, gained by the experience of early operation on doubtful cases, is one of intense alertness, weighing in the impartial balance points gleaned in each case. The cases are frequently observed so early that cachexia, anæmia, and wasting may all be absent. Fever, ulceration, and chronic discharging sinuses, are only observed in the neglected conditions.

Thus, for the pathologist, too, the diagnosis of cancer has undergone much change. Not only has a new laboratory technique replaced the old, but the routine tumour tissue received by the laboratory is of quite a different character. The laboratory is approached by the clinician for the purpose of establishing a diagnosis, and not to verify the diagnosis. The masses of doubtful tissue are often small, the entire tumour not being over one or one and a half centimeters in diameter. With such small tissue masses, the microscopical examination of which is to determine the malignancy and prognosis, the microscopist is assuming great responsibilities, of which he is not forgetful.

SOME ACUTE ABDOMINAL EMERGENCIES

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I DO not think I need apologize for the selection of the subject which I am about to present for your consideration this evening, as it embraces some of the most serious of the problems with which we are confronted almost daily. It is true that many papers have been read and much discussion has taken place in regard to most of the conditions with which we are going to deal, and if, as a consequence of this, we had learned all that there is to learn, or if the last word had been said in this connexion, we might very well refrain from further pursuing the subject. But one is daily impressed with the fact that although much has been learned, the knowledge acquired has not become as widely disseminated throughout our profession as it should be, and although considerable improvement has taken place in the recognition and treatment of these cases, one unfortunately has to admit that many lives are still sacrificed through clinging to ancient prejudices. In spite of all the work that has recently been done, and the marvellous progress which has been made, we still have much to learn.

Let us consider the subject under the following headings:

1. Acute inflammatory conditions.

2. Perforation of gastric or intestinal ulcers, or of the gall bladder.

3. Acute intestinal obstruction.

There are a few conditions which are not covered by the above classification, such as a ruptured ectopic pregnancy, twisted ovarian pedicle, acute dilatation of the stomach, and traumatic lesions of the abdominal viscera, and these, if time permits, will be referred to separately.

1. The most serious and the most frequent of all acute abdominal emergencies are due to disease of the vermiform appendix. Acute inflammation of the appendix, attended with perforation or gangrene, and rapidly leading to diffuse septic peritonitis, is one of the gravest conditions with which we have to deal, placing the

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patient's life in instant jeopardy, and requiring for its relief immediate surgical intervention. The early administration of a purgative by the friends of the patient, or unfortunately in some instances by the family physician, is undoubtedly responsible for the serious consequences in many of these cases, for the rapid onset of perforation and diffuse peritonitis is without doubt accelerated by the injudicious use of a purgative. If a child complains of pain in the abdomen, the first thing the mother does is to give it a dose of castor oil or salts, and we cannot too strongly emphasize the dangers of such a practice.

As yet practically nothing is known as to the functions of the appendix, but it seems only reasonable to suppose that it performs some function, considering its vascular supply and the fact that it is so abundantly supplied with lymphoid tissue. That it is of no great value in the internal economy is clear from the fact that ablation of the appendix results in no apparent interference with digestion or with the normal health of the individual.

It may be of interest here to mention that solids are digested and absorbed by the small intestine, and fluids are taken up in the large intestine; in other words, we eat with our small intestine and drink with our large intestine, and it has been roughly computed that of the fluids taken by the mouth only 10 per cent. is absorbed before the cæcum is reached. It is known that fluid taken by the mouth speedily excites a wave of peristaltic activity in the lowest ileum.

Harvey Cushing, Gilbert, Domenici, and others have shown that bacteria are most numerous and active at the junction of the large and small intestine. Harvey Cushing has also demonstrated that starvation will render sterile all parts of the intestine which can be caused to empty. It has also been proved that aperients not only excite activity in the small and large intestines, but render secretion more abundant, and considerably increase bacterial virulence. This has been confirmed by the findings after typhlotomy.

I should now like to point out the bearing of these facts upon cases of appendicitis. The first symptom in an attack of acute appendicitis is always pain, and should pain not be the first symptom in an attack of acute abdominal illness one can practically exclude the appendix. The pain is sudden in onset, of a varying degree of severity, and is usually at first referred to the epigastrium, but in a few hours it becomes localized to the right iliac region. As a rule nausea or vomiting soon follows. In a few hours there will be slight elevation of temperature and increase in the pulse rate,

with rigidity and tenderness over the appendix. If all food—both fluid and solid—is avoided, there will generally be abatement of the symptoms *if aperients are withheld.* Unfortunately in the majority of these cases the mother, wife, or nurse will have already administered a brisk purgative, the idea being that something which has been taken has disagreed with the patient, and must be got rid of. As a rule, within a few hours after the administration of a purgative the patient becomes worse, the pain more marked, and gradually the whole of the abdomen becomes rigid and tender, and the symptoms of acute, diffuse peritonitis are ushered in.

A large number of cases have come under my observation, in which I am practically certain that perforation of the appendix and diffuse peritonitis were due to the injudicious administration of purgatives. A very common history in such cases is that a few hours before the onset of the pain the patient partook of a hearty meal, or ate something which was supposed to have disagreed with him, and—acting upon this assumption—a brisk purgative was given. A few hours later, instead of the expected relief, the pain has increased in severity, and when seen there is abdominal rigidity, either limited to the region of the appendix or involving a wider area.

In an acute appendicitis, even though perforation ensues, if purgatives are not given, and absolute starvation is enforced, diffuse peritonitis does not as a rule supervene, but a localized abscess will usually develop. This fact affords the best indication for treatment; namely, that at the onset of an acute attack of appendicitis all food by the mouth should be withheld, with the object of arresting peristaltic activity in the intestine and reducing the virulence of the bacteria within the bowel, and in addition to this it is of course absolutely essential that no purgative be given. Even the administration of fluids, which must reach the cæcum to be absorbed, should be avoided. As the giving of aperients has been shown to increase the virulence of the bacteria within the cæcum, it will be quite obvious how important it is to withhold them when the appendix, which opens into the cæcum, is inflamed. In practically every case of diffuse peritonitis, due to a perforated appendix, upon which I have been called to operate, there has been a history of a purgative, and often of repeated doses of purgatives, having been given, owing to difficulty in getting the bowels to act, thus actively assisting in the diffusion of virulent microörganisms, and speedily producing generalized peritonitis.

In spite of the undoubted advantages of the so-called starva-

tion treatment of appendicitis, I am more strongly of the opinion than ever that early or immediate operation is altogether the safest and best procedure. There can be no doubt whatever that the only curative treatment is surgical; that operation should be performed immediately the diagnosis is made, and that the appendix should be removed if possible. In cases of diffuse peritonitis my own practice is to invariably remove the appendix. In cases of localized suppuration I am not generally satisfied with opening the abscess, but almost always remove the appendix also, and I have never had any reason to regret this procedure. In this connexion it should be borne in mind that the initial symptom, namely, acute pain, does not indicate the onset of appendicitis, but of its resulting peritonitis. If a purgative has been given in a case of acute appendicitis this fact should furnish an urgent reason for advising immediate operation. This is even more imperative in a child than in an adult, for *all cases* of acute appendicitis in children should be treated surgically. It might be mentioned that appendicitis is undoubtedly the most common condition in children requiring operative treatment. The symptoms present in adults are often lacking in children, for in many cases in children I have found the abdomen filled with pus at operation and a gangrenous appendix, when prior to operation the abdomen, although tender, was soft and without rigidity. A rectal examination should be carried out as a routine procedure in every case of acute abdominal disease in a child, as in this way it is possible to explore a considerable portion of the peritoneal cavity. In deciding for or against operation, it should be remembered that sudden cessation of pain after a typical onset is by no means uncommon. In such cases operation should be accelerated rather than delayed, as relief of pain may be due to sudden rupture of the distended appendix or the supervention of gangrene.

Unfortunately, it is the prevailing custom for the mother or nurse to give a purgative when a child complains of abdominal pain, and an educational campaign should be energetically undertaken to stop this very dangerous practice. Many of the so-called "bilious attacks" occurring in children, accompanied by colicky pain, vomiting, and slight fever, are undoubtedly mild attacks of inflammation of the appendix. I am not contending that all stomach-aches in children owe their origin to the appendix, but there is no doubt whatever that that organ is responsible for a considerable proportion of them. The best treatment, apart from operation, or until operation can be undertaken, is the so-called starvation treatment, with the patient in the Fowler position, and

the application of an ice-bag over the appendix, together with the withholding of purgatives and rectal alimentation.

One of the most important symptoms of perforation of the appendix is the presence of marked abdominal rigidity, which is nature's method of splinting and protecting the inflamed part. In a case of perforation the pulse-rate is never rapid to begin with, but often for some hours remains under ninety, and then gradually increases. In these cases of diffuse peritonitis the pinched and anxious expression of the face is of the greatest value in diagnosis.

The following cases show the disastrous results of the use of purgatives.

Mrs. M., aged forty-nine, was seen on January 5th, 1911. She was taken ill with pain in the abdomen, which was thought to be due to some irritant in the intestine, and free purgation was ordered by her physician. Instead of the expected relief, her pain continued, and the abdomen became hard and distended. Poultices were applied for two or three days, and then an attempt was made to get further movement of the bowels by purgatives. After using them freely, together with enemata, and obtaining no relief, a diagnosis of intestinal obstruction was made, and I was called in to operate. It was quite clearly a case of diffuse peritonitis, originating in the appendix. The patient was very ill, with an enormously distended abdomen of board-like hardness, a weak pulse, and some vomiting, a condition which did not promise much advantage from operation. However, an incision was made and pus let out, a gangrenous appendix removed and drainage provided. The obstruction persisted, however, and she died two days later.

M., a boy aged twelve, was given purgatives freely at the beginning of an attack of appendicitis. When I saw him two days later he had a pinched and anxious expression, with general abdominal pain and tenderness, but without rigidity. Operation revealed a perforated appendix, with diffuse peritonitis. The patient recovered.

I have no doubt that in this case the perforation and diffuse peritonitis were due to the purgation, and it further illustrates a condition that one frequently finds in children, namely, the absence of rigidity in diffuse peritonitis.

2. Acute Diverticulitis. Acute diverticulitis is a possible abdominal emergency which will very closely simulate appendicitis, as is shown by the following case:

M. O., aged sixty, was seen by me on October 3rd, 1910, in consultation with Dr. G. W. Ross. He had practically all the symp-

toms of acute appendicitis with perforation, with the exception that the pain and tenderness were situated on the left side instead of the right. He had been ailing about ten days when I saw him, and there was now a large mass in the left iliac region, extending over as far as the middle line, with general abdominal rigidity and tenderness. On making an incision, general peritonitis was found, due to rupture of an abscess on the left side, and drainage was provided. He died thirty-six hours later, and the post mortem examination showed that he was suffering from acute diverticulitis of the sigmoid. Seventeen pouch-like projections were observed bulging into the meso-colon, and measuring from two to five millimetres in diameter and one centimetre in depth. Their walls were thin, and contained no muscle. Several of them contained hard fæcal concretions. One of them had perforated, and communicated with the cavity of the abscess which it had caused. On microscopical section through the diverticuli, the walls were seen to be composed of the mucosa, submucosa, and serosa.

3. Perforation of Ulcer of Stomach or Duodenum. The abdominal catastrophe next in order of frequency to appendicitis is that due to perforation of the stomach or duodenum. Two types of ulcer are met with, the acute and the chronic, but it is usually perforation of a chronic ulcer with which one has to deal. This being so, the calamity could be avoided by having recourse to operation in all cases of chronic ulcer. The view is now quite generally held that in chronic ulcer surgical treatment is invariably necessary, and there is a reasonable hope that with improved methods of diagnosis the catastrophe of perforation may be entirely avoided. When a patient who has suffered from recurrent attacks of indigestion suffers more acutely in one than in any previous attack it is an indication of the imminence of perforation. In addition to the risk of perforation there is a further reason for advising operation in these cases, namely, that 80 per cent. of cases of cancer of the stomach have been shown to originate in chronic ulcer. The pain of perforation of an ulcer of the stomach or duodenum is of the most agonizing character. I should like here to briefly report a typical case of this kind.

Mr. H. B. W., aged fifty, seen January 30th, 1909, was suddenly taken ill at midnight with severe agonizing pain below the right costal margin. His family physician found him writhing in pain and in a profuse perspiration. From the intensity of the pain a diagnosis of gall-stone colic was made, and morphia administered. In spite of the application of hot fomentations and repeated injec-

tions of morphia, until one and one-half grains had been given during the night, but slight relief was obtained. When I saw him at ten o'clock the next morning he was propped up in bed, and had a pinched, anxious, and terrified expression. He was perspiring freely; his breathing, which was short and quick, was entirely thoracic, and he was suffering intensely. He was vomiting almost incessantly. The muscles were tense and rigid, and he held himself stiffly in a fixed position, being afraid to make the slightest movement, and scarcely daring even to breathe, lest the severity of the already intolerable pain should thereby be increased. His pulse was 92, and his temperature 99° F. A diagnosis of perforation of the stomach or duodenum was made, and immediate operation advised.

He was removed to the hospital and operated upon within two hours, when a perforated duodenal ulcer, close to the pyloric end of the stomach, was found, and closed by Lembert sutures. There was already some peritonitis, and drainage was provided. He made a good recovery from the operation, and everything was going on most favourably when, at the end of three weeks, he complained of pain in the region of the liver, and a few days later it was clear that he had developed a subphrenic abscess. This was opened and drained, and he was recovering nicely when he suddenly died about a week later from pulmonary embolism.

I wish here to further emphasize the character of the pain, which is the most agonizing of any pain with which I am acquainted. Another important feature is the attitude of the patient, who remains rigidly fixed in one position, being afraid to move even to the slightest extent. This is in striking contrast with the state of things observed in hepatic colic, in which the patient is often restless, and moves about continually in the attempt to obtain relief. Muscular rigidity is also more board-like and intense in perforation than in hepatic colic. In the former condition the local tenderness at the beginning is a very reliable guide to the site of the perforation. On account of there being scarcely any alteration in the frequency or volume of the pulse, the diagnosis of this serious condition is sometimes not made, so that I wish here to lay stress on the fact that you may have, and frequently do have, an unaltered pulse-rate at the onset and for some hours after perforation of the stomach or duodenum. A little later on the pulse-rate will, of course, increase in frequency and diminish in volume with the supervention of peritonitis. It is scarcely necessary to say how important it is to diagnose perforation soon after it has taken place

instead of waiting until peritonitis develops, as operation offers a percentage of recoveries in direct ratio to the time elapsing between perforation and operation.

I will here give a brief account of a case of perforation of the stomach resulting in a localized abscess.

Mr. E., aged fifty, operated on April 6th, 1909. He had been ill in the country for about two weeks, but no definite diagnosis was made. When I saw him a mass could be felt in the epigastric region, very tender to the touch, and with a tympanitic note over it. He gave a history of having had severe attacks of gastric pain, lasting from half an hour to several hours, and extending over a period of ten years. He had a temperature of 101°, the pulse rate being 50. It was quite clearly a local abscess, and we thought it likely to be due to perforated ulcer of the stomach. It was opened into, and about an ounce of pus evacuated. A perforation was found on the anterior wall of the stomach, extending up to the lesser curvature, large enough to allow of the passage of the index finger. The walls of the stomach around the perforation were greatly thickened. The perforation was closed by Lembert sutures and drainage provided. He made a good recovery.

Mr. R., Aurora, aged fifty-four, seen with Dr. Richardson on March 1st, 1909. He stated that the usual agonizing pain had come on twenty-four hours previously. A perforation was found in the anterior wall of the stomach, about two inches from the cardiac end, midway between the curvatures. It was closed and drainage provided. For the first twelve days he got on nicely, but then developed pleurisy, which was followed by empyema. A very small opening was made between the ribs, and a drainage tube inserted by his physician, which evidently was insufficient to provide good drainage. Later on a large mass developed in the upper abdomen, and perforated, flooding the abdomen with pus, and causing death. I have no doubt that in this case the empyema opened through behind the diaphragm into the general peritoneal cavity.

I might here refer to a couple of interesting cases of typhoid perforation.

The first case, G. S., aged twenty-nine, whom I saw with Dr. Rogers, of Ingersoll, was operated upon on October 17th, 1901, twenty-two hours after perforation, when a perforation was found about two inches from the cæcum. He was in the third week of typhoid. The perforation was closed by Lembert sutures. He made a nice recovery from the operation, but about a month later

developed a subphrenic abscess. This was operated upon about two weeks after its onset, and an enormous quantity of pus evacuated. He made a good recovery.

Mr. M., seen with Dr. Hall, of Little Britain, on October 6th, 1911. An operation was performed eighteen hours after perforation, at the end of the third week of typhoid, when a perforation was found about a foot from the cæcum, and closed by Lembert sutures. He made a good recovery from this, but about a month later complained of pain in his chest, followed by expectoration of very putrid material. The breath was very fœtid, and râles could be heard over both lungs. This condition persisted, and he died in a few days' time from what was supposed to be pulmonary gangrene.

Acute Hæmorrhagic Pancreatitis. Another abdominal catastrophe, to which attention was directed by Dr. Fitz some years ago, namely, acute hæmorrhagic pancreatitis, is not perhaps as rare as is generally supposed. The cases reported indicate that the number correctly diagnosed before operation is very small, but recognition of the cause of the symptoms should not be difficult. It very commonly occurs in stout individuals, with symptoms suggestive of the presence of gall stones, and jaundice may have been noticed on one or more occasions.

The onset of pain in these cases of acute pancreatitis is generally sudden. The patient may state that he had had some slight discomfort for some hours previously, but that the pain came on suddenly. It is referred to the upper abdomen, above the umbilicus, and passes through to the back. It is agonizing, and often causes a profound collapse or fainting. The face is often white, though the lips may be blue. Halstead has pointed out that lividity of the face and abdominal wall is often a striking feature in these cases. The extremities are cold; the pulse very rapid and of poor quality; in fact, the whole appearance of the patient would seem to indicate imminent death. Vomiting occurs early, and is frequently repeated, the vomitus consisting at first of the contents of the stomach, and then of bile in large quantities, very like that resulting from an obstruction situated high in the jejunum. The symptoms suggest profound poisoning, and it would appear probable that the toxic substances are produced as a result of the digestion of the pancreas by its own escaping secretion. The epigastric region is exquisitely tender, and there is marked rigidity of the upper abdomen, with some fulness, but the remainder of the abdomen may be soft.

Although some of these cases recover without operation, early operation is the safest course. Even though operation may not save the life of the patient it will relieve the agonizing pain, and thus considerably add to his comfort. More or less extensive fat necrosis is usually found in an enlarged pancreas and its vicinity, and an effusion of blood in the peritoneal cavity. Two cases of enormous fat necrosis involving the omentum have come under my own observation. If the condition is in an early stage the effusion of blood may be slight and fat necrosis may be absent. The treatment consists in opening and draining the gall-bladder, and passing tubes down to the pancreas for drainage.

Crises in Cholelithiasis. The crises developing in the course of cholelithiasis are very rare. I have met with a few cases of perforation of the gall-bladder which resembled very closely attacks of acute appendicitis, with the exception that the pain was situated higher up. As I have previously stated, one distinguishing feature between the pain of colic and that due to perforation of a hollow viscus is the ceaseless agitation and restlessness associated with the former. A patient suffering from colic—hepatic or renal—will toss about in ceaseless efforts to obtain relief, whilst one suffering from perforation holds himself rigid and motionless. In hepatic colic the rigidity of the abdomen affects only the immediate vicinity of the gall-bladder, all other parts being soft and free from tenderness.

Gangrene of the Gall-Bladder. As a rule there is a definite history of biliary trouble. The symptoms resemble those of an acute peritonitis below the ninth rib, and consist of pain and rigidity, probably associated with an initial rise of temperature, or even a rigor, the temperature subsequently tending to fall. Immediate operation is the only treatment. Delay results in danger to life from infective peritonitis, or extension of inflammation to the portal and hepatic veins and the inferior vena cava, and by way of the hepatic ducts to the liver. The treatment consists in removal of the stones and gall-bladder, and packing with gauze.

Acute Intestinal Obstruction. The most common cause of primary intestinal obstruction is a strangulated external or internal hernia. Other causes, in order of frequency, are intussusception, impacted gall-stones, and volvulus. In some cases it develops on a chronic condition, such as cancerous stricture of the large intestine. In all forms of intestinal obstruction the pain is sudden in onset and progressive in severity. It is diffused over the whole abdomen, paroxysmal, and frequently associated with reflex

vomiting, which increases in frequency, and in a few hours, or possibly in one or two days, becomes typical in character, the material vomited varying from bile-stained mucus to brownish fluid with a fæcal odour. The temperature is at first normal, but gradually becomes subnormal, and remains so until peritonitis develops.

INTUSSUSCEPTION. Intussusception is the only form of intestinal obstruction that is common in children. The majority of cases occur in children under twelve months of age, and a large proportion in children less than six months old, especially those who are weak and badly nourished. These cases are characterized by the sudden onset of paroxysmal pain, recurring at intervals of a few minutes, sudden collapse, and a few hours later discharge of blood and mucus from the anus. Vomiting sometimes occurs at this stage, but is not constant. Obstructive vomiting sets in later. The most characteristic sign is obtained by palpation of the abdomen. A sausage-shaped and movable tumour is felt, which hardens at the onset of each paroxysm of pain, and softens in the intervals between the paroxysms. Operation is the only treatment, and the prognosis is good, provided the operation can be undertaken within a few hours of the onset of the symptoms. The reason for the bad results so frequently obtained by operation in intussusception is that the operation is undertaken late, after other plans of treatment have been exhausted. I wish particularly to emphasize the fact that the *only treatment* in an acute intussusception in children is immediate operation.

MALIGNANT STRICTURE OF THE COLON. In malignant stricture of the colon there is a gradual onset, with marked abdominal distension and abnormally strong peristalsis. There may be attacks of diarrhœa, with prolonged intervals of absolute constipation, whilst the general condition may remain practically normal for some considerable time. While this is generally not an acute emergency, yet it happened to be so in a case of mine, a brief account of which I will give you.

I was asked to operate upon a man who was hurried to the hospital suffering from symptoms of shock and acute abdominal pain. He was fifty years of age, and had been working until one week previously. Since that time he had had almost complete obstruction, with occasional attacks of abdominal pain, and had been taking purgatives without result. His abdomen was greatly distended and very tender and rigid all over. On opening the abdomen the cæcum was found to be enormously distended, being

as large as a baby's head, and it was perforated in three places, a considerable quantity of fæcal matter having escaped into the peritoneal cavity. A small annular stricture was found in the sigmoid, not more than a quarter of an inch in vertical extent, but completely closing the lumen of the gut.

Volvulus. This condition is met with after middle life in people who have suffered from chronic constipation. In some cases the cæcum is involved, but most frequently the sigmoid flexure. Abdominal meteorism is a characteristic feature, but vomiting does not occur until a late stage. The diagnosis of intestinal obstruction is made from the intermittent and paroxysmal character of the pain, the progressive vomiting, the complete obstruction to the passage of fæces and flatus, and the absence of pyrexia and muscular rigidity. Failure to obtain a movement in twenty-four hours, in spite of the administration of repeated enemata, suffices to establish the diagnosis and to indicate urgent operation. The general adoption of this rule would undoubtedly result in saving many lives and in greatly improving the operative results in obstruction. In those cases of intestinal obstruction associated with acute infective peritonitis, immediate operation is only contra-indicated if death is imminent, and rapid operation and suitable after-treatment have sometimes led to marvellous recoveries in apparently hopeless cases.

Acute Dilatation of the Stomach. This is a rare condition of obscure origin, and may follow abdominal operations. The symptoms consist of abundant fluid vomiting, epigastric pain and distension, subsequently diffused over the abdomen, irregularity of the bowels, and severe collapse. At a later stage vomiting may cease, owing to complete atony of the stomach. The most valuable physical sign is succussion. As regards the diagnosis, the extreme abdominal distension may lead to confusion with diffuse peritonitis, or intestinal obstruction may be diagnosed if constipation is present. Many of these cases will recover, but unless relieved by evacuation of the contents of the stomach the condition is rapidly fatal. I had a recent case, following a hysterectomy, which responded to treatment in a marvellous manner.

Hæmorrhage from the Stomach. Surgeons are unanimous in the opinion that surgical intervention is sometimes absolutely necessary in cases of hæmorrhage from gastric or duodenal ulcers, and that in some of these it is the only means of saving life. Sometimes the primary cause of the hæmorrhage can be discovered and dealt with, but in other instances it is possible only to relieve the

distension by performing a gastro-enterostomy. In dealing with such cases it should be borne in mind that the hæmatemesis may be of hysterical origin, and that the gastric hæmorrhage sometimes merely represents vicarious menstruation. I may here refer to two cases.

Miss S., aged twenty-three, seen in consultation with Dr. Yellowlees and Dr. Caven a few months ago. She had had three very severe hæmorrhages from the stomach within twenty-four hours, which resulted in profound anæmia and a rapid, weak pulse. Every kind of medical treatment had been tried in attempting to arrest the hæmorrhage, but without avail. On opening the abdomen, there was no external evidence of ulcer of the stomach, so the stomach was opened, when a small ulcer was found on the posterior wall, near the lesser curvature. This was sewn over with chromic gut, and the opening in the stomach closed. She had no further hæmorrhage, and made a very rapid recovery.

Mrs. H., aged twenty-five, had repeated hæmorrhages from a duodenal ulcer. She became blanched and had a rapid pulse, and it was feared death was imminent unless the hæmorrhage could be stopped by operation. The patient was so weak, with a very small pulse of 140 and a subnormal temperature, that we felt we were accepting a grave responsibility in undertaking an operation under the circumstances. However, as we thought it offered the best chance, the abdomen was opened under ether anæsthesia, and as no indication of an ulcer could be seen in the duodenum a posterior gastro-enterostomy was done, followed by a good recovery.

Ruptured Ectopic Pregnancy. There is another abdominal emergency in addition to acute hæmorrhagic pancreatitis in which there is profound collapse, namely, an ectopic pregnancy, but there should be no difficulty in distinguishing between these two conditions. In the latter condition the characteristic symptoms consist in the sudden onset of pain in an apparently healthy woman, succeeded by collapse, with soft abdominal walls and a rapid pulse. If in addition to these signs a doughy swelling can be felt in Douglas's pouch, and there is a history of the slightest irregularity in the last one, two, or three menstrual periods, a diagnosis of ruptured ectopic pregnancy would be justified, and immediate operation should be undertaken. One feature of this condition is that there is never abdominal rigidity to any extent.

I should like to give a brief account of an interesting case of ectopic gestation, followed by intestinal obstruction.

Mrs. R., Montreal, aged twenty-seven, operated on December

14th, 1908. She stated that two weeks previously she was suddenly taken ill with very severe abdominal pain and faintness, and since that time she had had pain off and on. Her last period was two weeks over-due, and came on a few days after the pain referred to, and since then there had been a bloody discharge, containing shreds. On vaginal examination a tense swelling was felt behind the uterus. Ectopic gestation was diagnosed, and at operation a large quantity of blood, containing dark blood clots, many of which were adherent to the intestine, was found in the peritoneal cavity. The right tube, enlarged with a pregnancy of about six weeks, was lying behind the uterus, and bleeding from the fimbriated end. It was removed. The blood clots were washed out, and the abdomen was closed.

She did nicely for twenty-four hours. Soon after this she began to complain of abdominal pain, which was followed by distension. Her pulse soon increased in frequency, and vomiting set in. Enemata were given and other treatment instituted without effect. She steadily became worse, until twelve hours later she had a pinched and anxious expression, with a greatly distended abdomen, and a pulse of 128. We decided to re-open the wound, and when this was done the intestine was found enormously distended, and as there was no evidence of peritonitis or mechanical obstruction it was clearly a case of intestinal paresis. The transverse colon was punctured, and a large quantity of gas and fæcal matter removed, the small opening being closed with Lembert sutures.

The patient was considerably relieved, vomiting ceased, and the general condition improved, but thirty-six hours later she again complained of abdominal pain, which was soon followed by vomiting. A definite peristaltic wave could be made out starting in the right iliac region, and passing across the abdomen in the region of the spleen. A large number of enemata were given without effect. The symptoms increased in severity until it was quite clear that she was suffering from mechanical obstruction, and her abdomen was again opened under gas and ether. As soon as the peritoneum was opened, the first piece of distended bowel which presented through the wound was punctured and a considerable quantity of gas let out, as the distension was too great to permit of exploration. A volvulus of the small intestine was then found, involving about eight feet, which had passed up over the transverse colon and omentum, and occupied a position in the region of the spleen, in this way causing pressure upon the colon and obstructing

it; so that we really had an obstruction of the large intestine from pressure. Immediately after replacing the small intestine a large quantity of gas and fæcal matter passed down through the colon and out at the anus, causing her to have a huge movement on the table. Though considerably shocked from the operation she rapidly improved, and made an uninterrupted recovery.

Conclusions

1. The sudden onset of acute abdominal pain, with rigidity of the abdominal muscles, or even without rigidity, but with tenderness on pressure, indicates the presence of an acute lesion, and calls for immediate surgical intervention.

2. It will be clear from what has been said that these acute emergencies are dependent upon pre-existing disease, and therefore should be preventable by an early diagnosis and suitable treatment.

3. The careful consideration of the early symptoms, and observation of the site of greatest tenderness and rigidity, are most important in making the diagnosis.

4. Shock is not of necessity associated with perforation, as the condition of the pulse may remain practically normal for some hours after its occurrence.

5. In all cases of abdominal pain it is imperative that *purgatives should not be given.* This is especially important in children.

DISINFECTION IN AND AFTER INFECTIOUS DISEASES

By W. T. Connell, M.D., Kingston

THIS paper concerns itself only with the value of such disinfectant measures as are applicable to infected material at or after leaving the bodies of those infected. Disinfection of this character is of no value to the patient, except, perhaps, in some subacute or chronic infections where re-infection is possible, but is for the purpose of protecting the attendants, the family, and the public against the transference of such infected material to them.

Necessarily then in dealing with any infectious disease it is essential to have definite knowledge of the avenues through which the infective agents may leave the body, their longevity outside the body under the various conditions met with, and also their portals of entry in leading to infection of others. Given such knowledge in any infectious disease, the place and value of disinfection for that disease can then readily be assigned. Thus, in such diseases as malaria and yellow fever, which are transferred by mosquitoes, disinfectant measures directed against the excreta, clothing, and other fomites have no place, but are useful only when directed against the insect carrier itself. Disinfection as we ordinarily understand the term finds its chief value in those cases in which the body excretions or certain of them contain the infective material and are the means through which the disease is transmitted to others. We must clearly recognize, however, that pathogenic bacteria do not increase in numbers outside the body, though to this there are a few exceptions, such as the occasional growth of typhoid bacilli in milk. On the contrary we find that such bacteria nearly always find conditions of life outside the body adverse, so that the tendency is for such bacteria to die out, the rapidity with which destruction occurs depending on the bacterium, its numbers, and the conditions to which exposed. Under ordinary house conditions death occurs quite rapidly in the case of such microbes as those of diphtheria, scarlet fever, measles, and even those of tuberculosis. Hence the longer such bacteria are removed from the body, the fewer are left to institute an infection even if virulence be retained, but this also

seems to suffer through lapse of time. Thus the danger from such material becomes less, until in a comparatively short time it becomes nil, so that houses do not long remain danger points once we remove infected individuals therefrom. We cannot too strongly emphasize the point that infected individuals or articles recently infected by them, are the agents which transmit infection in nearly all our infectious diseases, including those above mentioned and also typhoid fever and even small-pox. True, a very small percentage of cases may become infected from old fomites through longevity of a virus, and I think all who are engaged in medical practice and especially in its sanitary aspect could find instances, but they are few in number as compared with cases due to exposure to more recent material or due to direct propagation.

I think we have, too, been laying quite too much stress in the past on aerial transmission of disease. Such transmission, with the possible exception of small-pox, does not occur except in the very immediate neighbourhood of such patients as, for example, diphtheritic ones, who in coughing, sneezing, or sputtering throw out infected droplets into the air about them, which may be inhaled before they have fallen. Tangible or direct means of carriage account for the vast majority of infections, and aerial transmission can largely be ruled out of court. Such tangible contact with the sick is often not traceable, but we must remember that besides the recognized sick, as, for example, those suffering from such diseases as typhoid fever, diphtheria, and even scarlet fever, there is a fair percentage of unrecognized or missed cases, cases which may not follow the usual clinical types or be so mild as not to be seen by a physician. Or again, in the case of typhoid we have to consider as well the probable presence of healthy carriers. If recognized cases are cared for, it is to these missed or unrecognized cases of sickness, to convalescents or healthy carriers, that we must assign the largest share in the spread of disease, and not to infection of rooms and clothing.

Keeping these conditions in mind we can understand how disease may spread despite isolation and disinfection of recognized cases. It is the duty of every physician to direct, in every case of infectious disease, that the infectious excretions be properly disinfected so as to limit the amount of possible infective material. The time to employ disinfectant measures is just as soon as possible after removal of the same from the body.

In disinfection by chemicals or by heat it is very necessary to emphasize to the nurse or attendant that the material to be des-

troyed must be brought into contact with the chemical and that time is required for the latter to act; e.g., throwing a disinfectant solution over a typhoid stool and then depositing this in a privy is a waste of disinfectant, and entirely valueless as a sanitary measure. Yet this is the form of stool disinfection I have actually heard advised by several physicians, and certainly is the method which quite 25 per cent. of our physicians permit the attendants to carry out. A proper strength of the disinfectant solution, a thorough admixture, and sufficient time for the destructive action of the solution, are points in disinfection which must be insisted on. Next to the excretions themselves, soiled clothing and bedding harbour infective matter, and these should be cared for as carefully as the excretions. The hands of the sick, the hands and clothing of attendants, or other contacts, stand next in order as possible means of transmission not to be neglected. Disinfectants are not as much required here as are ordinary measures of cleanliness.

Have there been any practical applications of the doctrine that aerial transmission of disease is rare, except in the very immediate vicinity of certain types of infectious disease, and that other more tangible means of contact or carriage,—by bodily contact, fingers, food or water, flies, etc.—must be the chief means by which transmission occurs? I can only point to the practice of certain hospitals where a case of infectious disease develops in the wards, or the practice in certain isolation hospitals where at times a child entering with one disease will be in the period of incubation of another which develops in due course, e.g., measles or diphtheria in scarlet fever. The practice in the Monsall Fever Hospital, Manchester, is an excellent illustration. If, for example, in the scarlet fever ward, diphtheria appears, the patient's bed is surrounded by tapes simply to emphasize to the nurses or attendants that certain special precautions are to be taken. Thus, all food vessels, medicine bottles, and appliances necessary for the patient are to be used solely by this patient. The nurse must put on a special cover over her dress, wear rubber gloves, and take care to disinfect carefully all swabs and sputum. She must also look carefully after the bedding and clothing of this patient. Before waiting on other patients, she must remove the special cover and gloves. No cases of infection have been transferred to others in the ward since this method has been adopted,—a proof, if any were needed, of the absence of danger from aerial transmission for distances greater than a few feet and that, if there is no tangible means of carriage, infection will not occur. It strongly emphasizes, too, the fact that infection is personal, or as

Comby puts it, "Persons, not things, are the carriers and transmitters of infection."

Now what shall we do after cases of infectious disease are removed from their rooms? Of what value are disinfectant measures then? The answer depends very largely on the previous care of the patient. If care has been exercised with infected excretions, etc., all that needs to be done in such a case, whether it be measles, scarlet fever, diphtheria, or tuberculosis, is to remove and disinfect all washable bedding and clothing, hang out in the air and sunlight for some hours or days unwashable clothing, and give the room a thorough cleaning and aeration. Gaseous disinfection will do no good and is an unnecessary expense.

If, however, the patient has not been well cared for and the room is not in good condition, the gaseous disinfection can be made a preliminary to the removal and direct disinfection of clothing and bedding and the cleansing of the room. Gaseous disinfection, at best, is but a surface disinfectant and, as ordinarily carried out, is valueless, except that it requires thorough aeration afterwards to make the rooms livable, and again acts as a means of getting other more necessary things done afterwards, particularly a thorough cleansing. Chapin, in an address on terminal disinfection before the American Public Health Association September, 1910, pointed out very clearly and emphatically the valuelessness of such measures from a public health standpoint, their great expense and the greater need there was for adequate disinfection during the disease and for recognition of mild cases; and with him, after twelve years' experience, I fully agree.

THE PRESENT STATUS OF THE WASSERMANN REACTION

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PROBABLY no one of the four centuries since syphilis has scourged humanity has shown such wonderful advances in the diagnosis and therapy of that dread malady as the first decade of the twentieth. Among those who have made the decade notable for its advances, Wassermann takes no mean place, as the discoverer of the serological reaction which bears his name.

The phenomenon of complement fixation, which he has applied to the diagnosis of syphilis, was originally demonstrated by Bordet and Gengou in 1901. Just as Wassermann was indebted to others for the method, so the reaction which now almost universally bears his name owes most of its success to his imitators and successors; for the original reaction of Wassermann, Neisser, and Bruck of 1906 bears but slight resemblance to that generally practised now, either in its technical details or in its practical achievements.

The original research of Wassermann used as antigen an extract of organs rich in syphilitic virus, and denied the possibility of obtaining a successful reaction with extracts of normal organs. The specificity of the reaction depended upon the correctness of that hypothesis. It was very soon revealed that the reactions could be as easily obtained with alcoholic extracts made from normal organs, where there was not the slightest suspicion of a syphilitic taint. The conclusion was immediately drawn that the reaction was not specific, and this belief received added confirmation when it was found that complement fixation was possible by means of purely chemical processes.

Without going into the question of the biological specificity of the reaction, which, in spite of all to the contrary, is still maintained by the Wassermann school, the fact of the clinical specificity of the

From the Pathological Laboratory, Montreal General Hospital. Read before the Montreal Medico-Chirurgical Society, February 16th, 1912.

complement binding reaction seems proved. For, apart from a few exceptions, the Wassermann reaction is only obtained in syphilis. That in leprosy, malarial fever, during the febrile stage, frambœsia tropica, and recurrent fever, the same or a like reaction is obtained, seems certain. In the early days of the reaction a group of workers found a high percentage of positive results in various non-syphilitic diseases—scarlatina, broncho-pneumonia, malignant disease, tuberculosis, etc., which the later researches of those who have worked with the method more constantly have failed to confirm. The idea is still prevalent that scarlatina, *per se*, gives an occasional positive reaction. In disproof of this we would cite the results of Boaz, a Copenhagen worker of large experience, who found one weak reaction in sixty-six cases, this reaction being absent two weeks later; and of Noguchi who in sixty-three cases found one positive result in a child, later conclusively proved to be suffering from congenital syphilis. The reaction in scarlatina, even if we grant it occasionally present, is at the most a very transitory one and disappears with the subsidence of the fever. In scarlet fever, as in every other non-syphilitic disease, when a positive reaction is present the possibility of a latent luetic infection must be considered and syphilis excluded before the Wassermann test can be so disputed. With the possible exception of scarlet fever in the febrile stage, and the tropical diseases above mentioned, which in our climate play no rôle, one is justified, in the event of a positive reaction, in making the diagnosis of syphilis.

We have hinted that the original Wassermann reaction has been greatly modified since its first publication. The results obtained in the first publication, 19 per cent. of positive reactions in undoubted syphilitic cases, did not promise that the method would have the great, practical, clinical value its modifications have since evinced.

There have been numerous modifications of the method, of which it will not be necessary here to treat in detail. For our own part, after experimenting with several, the original Wassermann, the Hecht, the Tschernogubow, we have utilized the Noguchi modification with slight technical modifications of our own, in the belief that it is the most accurate and reliable, the most adaptable to all sera and the needs of the clinic, and above all, the one theoretically most correct. Without wishing to be dogmatic on the point of the superiority of this over any other method, we are convinced that certain points are essential to accurate work performed by any method. The reaction can only be carried out in

properly equipped laboratories by experienced serologists. Whatever method the worker employs he should have had an adequate experience in serological work and in the method of his choice before diagnosis is attempted. And above all, he should have access to proper syphilitic controls of all his reactions.

Our own opinions are based upon the performance of over two thousand reactions, carried out in the last three years. We hesitate to put as much reliance upon the findings of the earliest period of our work, as statistics of all the cases would perhaps be misleading or unfair if the earlier failures were included. We have based the statistics we shall later refer to upon the series of cases treated by salvarsan, some three hundred and seven in number, because these have been most accurately observed, though by no means selected.

The Reaction in Non-Syphilitic Cases. In non-syphilitic cases, we have never obtained a positive reaction. Boaz, in his series of ten hundred and sixty-four cases, obtained only one positive, the case of scarlet fever above mentioned, i.e., a transitory reaction in one case out of sixty-six cases of scarlatina.

The Reaction in the Primary Stage. The percentage of positive reactions in the primary stage obtained by different observers varies greatly. This is owing to the fact that the reaction does not develop till some time after the dissemination of the syphilitic virus throughout the blood of the infected person. To say exactly in each case when the positive reaction appears is difficult, owing to the doubt usually present in deciding the exact date of the infection. We have noted one case where the reaction was present six days after the appearance of the sore. On the average the reaction first appears between two and three weeks after the appearance of the primary lesion, or six to seven weeks after infection. Twenty-one out of twenty-eight cases in the salvarsan series gave a positive reaction when first noted. All of the negative cases developed later positive reactions, except one case where the diagnosis was made by the finding of spirochætæ pallidæ eighteen days after exposure, in this case the reaction remained negative as a result of immediate treatment with salvarsan. In the primary stage, as a result of the late appearance of the reaction, the finding of the spirochæte pallida is of greater value than the Wassermann reaction, but in cases where it has been impossible to demonstrate the spirochætæ pallidæ, in mixed infections, periurethral infiltrations, and phimoses, it is possible by means of the Wassermann reaction to make an early diagnosis and inaugurate antisyphilitic therapy before the appearance of

secondary symptoms. Conversely in differential diagnosis, in the absence of the spirochætæ pallidæ, a repeated negative Wassermann reaction is equally important in the exclusion of syphilis. It is now a rule of the clinic to make frequent serological examinations in cases of supposed chancroids, spirochætæ pallidæ not being found, and in a considerable number of cases syphilis has been thus diagnosed before the appearance of secondary symptoms. Frequently one finds chancroids with suspicious indurations. Here, in the absence of the spirochæte pallida, a persistent negative reaction enables us to eliminate syphilis.

The Reaction in the Secondary Stage. Untreated cases in this stage give practically one hundred per cent. positive reactions. Referring to one hundred and thirty-nine cases in the salvarsan series, one hundred and twenty-three were positive. Of the remaining sixteen negatives, thirteen had previously received sufficient treatment to render the reaction negative; the technique in two cases we question, while only one was a definite negative. As we shall show later, in speaking of the influence of treatment on the Wassermann reaction, previously treated cases do give negative reactions, depending upon the interval from the last treatment. The reactions in the previously treated are on the whole never as strong as in untreated cases. It is hardly necessary to dwell upon the importance of the Wassermann reactions in the diagnosis of single or isolated lesions of syphilis, where otherwise recourse must be had to a more or less lengthy period of observation or to the blind empirical *post hoc* of a therapeutic test. At the same time it must be remembered in differential diagnosis, that a positive reaction does not make a definite diagnosis of any local lesion. It simply means that the patient in question has syphilis, not that the lesion in question is necessarily syphilitic. As to the value of the negative reaction in doubtful cases, it was formerly believed and is still held by many, that a negative reaction is valueless. For our own part we are inclined to believe with Boaz that untreated cases, resembling secondary syphilis, and giving a repeated negative Wassermann reaction, are in all probability not syphilitic.

The Reaction in Tertiary Syphilis. Here the conditions are much the same as in the secondary stage. In untreated cases the reaction is practically a constant one. In cases previously subjected to treatment, the reaction can be absent, or much weaker in degree.

In the salvarsan treated series of forty-nine tertiary cases, thirty-nine gave a positive reaction. Of the remaining ten, eight

had previously received enough treatment to explain the absence of the reaction, and in two we question our own diagnosis in view of the subsequent progress of the cases. The value of the reaction in the field of differential diagnosis is even greater than in the secondary stage. Much light has recently been thrown, by means of the Wassermann test, upon the nature of many visceral lesions. The part played by syphilis in the causation of aneurisms, arteriosclerosis, and certain cerebral and spinal diseases, is so well recognized as scarcely to call for notice here. All other branches of medicine and surgery are equally benefited by the serological reaction. Conversely, as in secondary syphilis, the repeated absence of a positive reaction in an untreated case resembling tertiary syphilis, renders the diagnosis of syphilis highly improbable.

The Reaction in Latent Syphilis. In latent syphilis, only a positive reaction is of any significance. The figures of different observers vary greatly, depending on the nature and extent of treatment. Referring again to the salvarsan series of twenty-three early latent cases (i.e., within three years of the infection), eight were positive, while the fifteen negatives had previously received more or less treatment. Of the late latent cases (i.e., over three years from the infection), twelve in number, three were positive and the nine negative had been subjected to treatment. The positive reaction tends to be more frequent and more intense in inverse proportion to the amount of previous treatment. The Wassermann reaction has shown that many cases hitherto regarded as cured or immune are really suffering from latent syphilis. The immunity of mothers and infants, according to the laws of Colles and Profeta, has been shown by Wassermann statistics to depend on the fact that the so-called immune individuals are really suffering from syphilis.

The Reaction in Congenital Syphilis. In this shorter series, three out of four were positive. The one negative finding was of questionable technique, and we have had no opportunity of repeating the test; seventy-five per cent. positive reactions in congenital syphilis is rather low, as compared with the statistics of larger series, which usually give over ninety-five per cent. positives. The reaction here tends to be stronger than in any other form of syphilis.

The Reaction in Cerebral Syphilis. Of the salvarsan series, thirteen in number, seven were positive, while the remaining six had been subjected to treatment.

The Reaction in Tabes Dorsalis. In this series, six out of

seven cases gave positive reactions, two of these being weak ones. The negative case had been well treated by mercury and potassium iodide.

THE REACTION IN GENERAL PARESIS. In this disease, which according to most observers gives a percentage of from eighty to one hundred per cent. positives, we have only two cases, one positive the other doubtful.

THE INFLUENCE OF TREATMENT ON THE POSITIVE REACTION. It is generally conceded that any treatment having any influence on the clinical symptoms exercises the same effect upon the positive reactions of the serum. We have found this the case, like other observers, and particularly after salvarsan. By technical procedures permitting the quantitative estimation of the syphilitic antibody content of any serum, it has been possible to trace the gradual weakening of the positive reaction, after treatment, from its maximum strength to its complete absence. The only exceptions have been found in primary or early secondary cases where at first the reaction has been absent or of moderate strength, and later has become positive or increased in intensity, a gradual decline to complete absence following within a few weeks. The rapidity with which the reaction disappears varies. The more intense the reaction the longer it takes to disappear. The older the syphilis the more difficult it is to eradicate it. The rapidity of disappearance varies directly with the intensity and efficacy of treatment. The shortest time of disappearance of a positive reaction has been, in a primary case, two weeks. The average time taken for the disappearance of the reaction is in our experience between five and six weeks, after salvarsan treatment.

The value of the Wassermann test in the control of treatment is important. While our observations have been more exact in cases treated by salvarsan, our experience with mercury and potassium iodide leads us to the same conclusion that others have arrived at, that salvarsan is more efficacious than mercury, and that potassium iodide has little or no influence upon a positive reaction.

If treatment has been inadequate, syphilis, true to its relapsing character, will recur. And with the clinical symptoms the positive reaction usually returns. Several of the early salvarsan treated cases who, from design on our part or neglect on theirs, only received one or two injections, returned six months later with positive reactions and definite clinical symptoms. Three of these cases were reinjected with salvarsan and the reaction observed to its disappearance. They remained free from symptoms and the reac-

tions continued negative. Two of these have in the past few weeks redeveloped positive reactions, one case showing indefinite syphilitic signs.

The almost constant presence of the reaction in every case of syphilis, with the exception of the early primary sore; its almost constant presence in every recurrence; the influence of treatment on a positive reaction in cases of latent syphilis; the possibility of patients without symptoms but giving a positive reaction, infecting others, giving birth to syphilitic children, or later developing typical recurrences or parasyphilitic lesions; that apes can only be reinfected when the serum reaction is negative—these facts have been responsible for the axiom, first expressed by Citron, and later championed by Lesser, Neisser, Finger, and a host of others, that a positive reaction indicates the presence of active syphilis in the body of the person giving the reaction.

Granted the truth of this, the Wassermann reaction is our most valuable adjuvant in the therapy of syphilis. A positive reaction is a symptom of syphilis and must be treated like any other ordinary, clinical symptom if results are to be achieved. The findings of Boaz from an experience of recurrences larger than ours, have shown this in a most striking manner; seventy-four cases of syphilis which had been treated until symptoms disappeared and the reaction became negative, and on whom serum examinations were made regularly, developed positive reactions. He divided the cases into two groups; one group of twenty-four was left without treatment, while the larger group of fifty was treated immediately. Of the treated cases only three developed any clinical signs, these subsiding quickly during the course of treatment. All the untreated cases developed clinical signs within a period of one and a half months.

A positive reaction in the early latent period of syphilis is therefore regularly followed by a clinical recurrence. In some cases reaction and recurrence are coincident, while in a few, recurrence does occur without a positive reaction (none in our experience), but for the most part the positive reaction appears before the recurrence. If one treats the patient as soon as the positive reaction is shown, the clinical recurrence can be prevented.

In the late latent period, where the lesions are apt to be found in the internal organs, it is not so easy to prove the coincidence of reaction and syphilitic lesion. Enough conclusive findings have been observed, and, reasoning by analogy, we are justified in regarding a positive reaction as a symptom of syphilis, and treating it as such.

The Wassermann Reaction in Relation to Treatment

What part should the Wassermann reaction play in directing anti-syphilitic therapy? We have seen how valuable it is in the control of treatment. Are we justified in basing our treatment on the behaviour of the Wassermann reaction? Up to the present time the best method of treatment has been the chronic intermittent. Are we justified in discarding this well-tried method for the newer biological method of Citron? Briefly, this therapy, which has numerous adherents, consists in treating a case of syphilis intensively till the symptoms and positive reaction disappear. Examinations of the blood serum are made at regular monthly or bi-monthly intervals, and subsequent treatment is made dependent upon the Wassermann reaction, or, it goes without saying, on the presence of clinical symptoms. Should the Wassermann reaction become positive, with or without symptoms, treatment is reinaugurated and continued till the reactions and symptoms disappear. The routine of serum examinations is then continued. Should the reaction remain continuously negative for twelve months, without any clinical symptoms developing, the patient can be declared cured. Is this a method to be applied to the careless and ignorant, many of whom discontinue treatment only too eagerly, once clinical symptoms are absent? We know the toll paid by the inadequately treated in tertiary and parasyphilitic lesions. Even after salvarsan, recurrences are only too frequent; we have quoted two cases of second recurrence. Under a chronic intermittent form of treatment, all of these would probably have been prevented. The earlier and oftener the syphilitic individual is treated, the greater the chances of ultimate success.

It seems to us, therefore, in view of our present still limited knowledge of syphilis, that it will be more practicable, more advisable, nay, even imperative, to treat every case of syphilis in the chronic intermittent and intensive manner for two years at least, whether with salvarsan, with mercury, or the two combined, later applying the method of Wassermann control. If a patient so treated shows no symptom and a negative reaction over a further period of twelve months or more, he can be declared in all probability cured, though one is not yet justified in making such a definite assertion.

TABES DORSALIS: THE EXHAUSTION THEORY WITH EXPERIMENTAL EVIDENCE

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FOR a disease that is clinically so common and in which autopsy material is so frequently obtained, the usually accepted pathology of tabes is most unsatisfactory and unconvincing. On looking up the usual text-books we find that such authorities as Erb, Oppenheim, and Starr, while recognizing that the disease is confined to the sensory neurones of the nervous system, admit that no satisfactory theory of its pathogenesis exists. Gowers does not attempt to discuss it, and Dana is an adherent of the mechanical theory. Nagiotte (*La Presse Médicale*, December 10th, 1902) defines tabes as a disease which is characterized anatomically by an inflammatory lesion which attacks a certain number of sensory or motor nerve roots at their exit from the subarachnoid space, and which is due to a syphilitic meningitis. He admits that this meningitis by itself is not sufficient to produce tabes, because a meningitis may be present and still no symptoms of tabes appear. He describes in his cases of tabes what he interprets as a transverse interstitial neuritis of the nerve root, which has spread inwards from the meningitis and has affected the intra-fasicular connective tissue, and he thinks the progressive character of tabes is due to the syphilitic origin of the meningitis. He states that in the early stages the lesion is seen in the intra-medullary portion of the root fibres, while the extra-medullary portion may be intact, and suggests that it is probable that the distal portion of the neurone is first attacked and that the disease progresses slowly towards the trophic ganglia. The process consists of a progressive atrophy of each fibre, characterized by a thinning and disappearance of the myelin sheath, while the axis cylinder may persist for a long time—a process differing very essentially from Wallerian degeneration, as we usually see it in an axon severed from its nucleus. He finds the anterior root frequently affected by this "interstitial neuritis," so-called, but its fibres do not degenerate peripherally, for some unknown reason. He finds that in the same case where all of the roots are exposed to the same conditions, the parenchymatous changes in the different roots

and in the different fasciculi of the same root, vary with the degree of the interstitial lesion.

Mott—in the fourth volume of Power and Murphy's "System of Syphilis"—states that he has found that the changes in the cells of the posterior ganglia are indeed insignificant, as compared with the degenerative atrophy of the fibres emerging from the ganglian. In many instances some of the cells are shrunken, the nucleus is eccentric, and even the capsule empty, as if there had been a complete atrophic decay. He shows that the anterior root consisting of normal fibres, lying by the side of the degenerated and atrophied posterior root, is conclusive argument against any mechanical process of strangulation at the point of exit from the dural sheath. At the proximal end of the ganglion in the entering root, there are seen fine fibres, but these are much attenuated; while at the distal end the fibres appear healthy. In longitudinal sections of the posterior spinal ganglion, with a long attachment of the ventral and dorsal roots, the myelin sheath of the fibres, which still possess the property of staining blue with Pal Weigert stain, becomes somewhat attenuated and fainter as one proceeds away from the ganglion towards the cord. Again, one finds the peripheral fibres proceeding from the ganglion quite healthy in appearance as regards the myelin staining, and yet remote sensory fibres are degenerated.

We have, then, speaking generally, an atrophic condition of the sensory protoneurones, which is most marked, as both Nagiotte and Mott show, in the peripheral parts of the neurone and especially in the intra-medullary part. Mott has shown conclusively that the chronic meningitis, with the associated transverse interstitial neuritis, cannot be the cause, and one would naturally expect that if such a strangulating process were at work, we should see the characteristic Wallerian degeneration with the fatty degenerative changes of the myelin sheath and the breaking up of the axis cylinder. These changes after any sort of injury would be more pronounced near the injury in the early stages and diminish towards the periphery; whereas in tabes there is a simple atrophy of the whole axis cylinder beginning at its extermity, and there is no breaking up of the myelin into fatty globules. Modern research shows a profound biochemical change in the blood as the result of the action of the syphilitic virus, and according to Mott it is possible that there is a biochemical defect or subminimal deficiency in the blood of lecithins or lipoids.

From my experience with this disease, I am of the opinion that there is a mildly active, chronic syphilitic process about the vessels

and in the meninges, but that this does not cause the lesion in the posterior columns by any mechanical process, but rather by generating toxines and producing the biochemical changes in the blood referred to by Mott, and these retard the anabolic processes of the cells.

That there is an active syphilitic process present I think is evidenced by the increase in the globulin content of the cerebrospinal fluid, in the lymphocytosis present in these cases, and the fact that both the globulin content and the lymphocytosis can be very materially and beneficially influenced by treatment with salvarsan, as we have proved in the Neurological Outdoor Clinic at the Royal Victoria Hospital. I hope this will later be the subject of a paper by Drs. Kaufmann and Landry, who have been doing this work. That this syphilitic process does not act mechanically, as held by Nagiotte, Obersteiner, and most other teachers, I think has been sufficiently shown by Mott's observations already quoted. And besides this, it is impossible to imagine how such a process, acting mechanically, could produce an Argyl-Robertson pupil with the loss of reaction to light, while still retaining its activity to accommodation; or again, could it explain why, in individuals whose occupation leads them to use their arms more constantly than their legs, the symptoms of tabes affect chiefly those parts most used and we get the lesion in the cervical cord. I presented to this society,* on a former occasion, very good examples of this. One was a tailor who while at work for many hours of the day sat on the floor and sewed. He showed quite normal coördination in the lower extremities, but in the arms, a marked ataxia, and moreover, as in threading his needle he was constantly using the muscles of accommodation, he had a very marked paresis of both internal recti and his pupils no longer reacted to accommodation or to light. The other two were similar cases.

I would like to quote another case, a man aged forty-four, with typical tabes, the lightning pains and the ataxia, the Argyl-Robertson pupil, and loss of tendon jerks; he said he was able to hold his urine for twelve hours without distress, and had some hesitancy in starting micturition. He had had lues twenty-five years ago. He stated quite spontaneously that for some years his duty had been to go and clear up any wreck that occurred on the railroad, and of course this work had to be done quickly. On many occasions he would be on his feet for thirty-six hours, or more, working strenuously, and he had frequently noticed that at the end of this time,

*Montreal *Medical Journal*, Vol. xxxix, March, 1910, p. 162.

when he was tired, he would have unsteadiness and difficulty in walking similar to that present at the time of examination, but that this would pass away in two or three days with rest. His ataxia had really begun only two months ago, after a severe grippy cold, combined with a certain degree of mental worry and distress owing to the illness and final death of his mother.

It seems reasonable to suppose that if a cell is not getting proper nutrition and yet continues to function, the katabolic changes will gradually overbalance the anabolic ones, and that the cell will sooner or later reach a condition of exhaustion; and if this exhaustive process proceeds very slowly it will lead to a condition of atrophy. The cell, in its efforts to survive, would sacrifice first its most distal extremities, just as in the plant that has not been watered enough for some time, it is not the root that dies first but the distal leaves and branches, so in the cell we would have an atrophy—not a degeneration—in the part of the axis cylinder most distal from the cell body, as has been described in tabes. The fact that the intra-medullary parts of the neurones have no neuralemma sheath, while the peripheral fibres have, is probably sufficient reason for the relatively greater affection of the former portion of the neurone—although degeneration of the peripheral part of the neurone does occur as well. We would not expect to find any marked changes in the cell itself, because once its fibres have atrophied and their place has been taken by the proliferation of the surrounding connective tissue, as happens in any organ when the parenchymatous tissue goes under, it no longer functions, and, consequently, the cause of katabolic change being to a large extent removed, the cell regains a more or less normal appearance, which explains the absence of lesion in the posterior ganglia.

With such a biochemical change in the blood, noted by Virchow, Martin, Hillis, and Auz, the anabolic changes must necessarily be retarded to a greater or lesser degree, and one must realize that where the katabolic changes due to activity or functioning of the cell are continually greater than the anabolic ones, if only to a slight extent, that cell must suffer in the same way as a plant does that gets insufficient water. Now, where all the cells of the nervous system are under the same conditions of nourishment, we might expect all to suffer similarly and to an equal extent; but if we consider the function of the various systems of neurones, we will realize that certain cells are almost constantly active while others are not. For instance, those neurones which subserve the function of maintaining the tone of the muscles, and those that convey the sense of

position of the muscles, are functioning continuously. Under these conditions we would expect these cells to suffer first, producing the loss of tone and loss of sense of position of the muscles—which later gives rise to definite ataxia—that one sees in very early tabes. And if one extremity, or a pair of extremities, is continuously used much more frequently or strenuously than the other extremities, then the neurones maintaining and regulating the tone of the muscles of that extremity and the sense of position of its muscles, will have relatively far more work to do than those of the other extremities and will become exhausted and atrophied more quickly. Thus, in the case of the tailor quoted above, who used his arms chiefly, the symptoms were confined to those parts which he most frequently used. The action of stimuli from the sensory neurone of the spinal reflex arc on its motor neurone is responsible for the maintenance of tone in the muscles, and when the sensory neurone, through its constant activity, becomes at last exhausted, the break in the reflex are thus formed causes also the loss of tendon jerks. The objection might be advanced that the anterior horn cells should also become exhausted and atrophied, but, as Gordon Holmes pointed out, if one considers that they are so constituted normally as to respond to two sets of stimuli—first those from the motor cortex through the pyramidal tracts and secondly the reflex ones—one can realize that they may have the power to recuperate while one of these is not acting.

The neurones which subserve the sense of position in the muscles travel in the cord in the posterior columns, as has been shown by Henry Head, and these being exhausted and having become atrophic, there is the consequent overgrowth of fibrous tissue and sclerosis of the posterior columns. Possibly this complementary overgrowth of fibrous tissue has been interpreted by Nagiotte as interstitial neuritis. In the same way one can explain the Argyl-Robertson pupil with its loss of reaction to light and its activity to accommodation. The pupil normally reacts very much more readily and rapidly to light than it does to accommodation. In glancing about, unless one focuses on a near object, after looking at a distant one, there is no reaction to accommodation; but if one glances from a window to a wall or any darker object, or from a lamp to a book, or the carpet, there is a reaction to light, so that these neurones which serve the reaction of the pupil to light become exhausted first, with the subsequent immobility.

The bladder symptoms of tabes may be explained in the same way. The sensory neurones constantly conveying sensations from the bladder become exhausted, with consequent production of loss

of vesical sensibility, and I continually get a history of the patient being able to retain his urine for twelve hours or longer without discomfort in the early stages. Loss of tone in the bladder wall naturally follows, and causes that ordinary symptom of not being able to start micturition immediately on the attempt. With the loss of sensibility and tone, and consequent overburdening, the work of the sphincter is increased, and it finally gives out, giving rise to the distressing incontinence of urine.

Thus one can explain the greater frequency of the disease in men than in women—because men in the pursuit of livelihood, or from their habits, naturally expose themselves to the chances of greater fatigue than do most women. Mendel's statistics are very interesting in this respect. He showed that in his private sanatorium, among the better classes, tabes occurred in the proportion of twenty-five times in men to once in women, while in his public clinic, where the women practically competed with the men in their struggle for existence, and so were exposed to very much the same exhausting conditions, the proportion was only three men to one woman. The rapid increase of the symptoms of tabes following some acute infection will now be recognized as due to the sudden addition of toxines still further retarding the anabolic changes, and the associated fever hastening the katabolic changes in cells already affected and with little resisting power left.

By this explanation of the symptoms we can understand why, when optic atrophy develops, ataxia so seldom does, because when a man is blind, or partially so, he cannot get sufficient occupation to fatigue or exhaust the neurones, and one might suppose that the mental worry caused by the onset of illness, with the consequent inability to provide a livelihood, would produce a similar condition of exhaustion of neurones in the cerebral cortex and account for the great proportion—amounting to fifty per cent. in Mott's experience—of cases with optic atrophy that develop general paresis.

It gives us also a very reasonable explanation for the fact that tabes is so seldom seen in the natives of Egypt, although syphilis is so widespread among them. Here the natural habits of the native, with his absolute lack of any impelling ambition, prevents his allowing himself to become sufficiently exhausted to produce the lesions of the disease. In Japan, too, until quite recent years, the scarcity of cases of tabes was remarkable, while, more recently, following their entrance into the national arena in competition with other civilized nations, tabes has become comparatively common. The great incidence of the disease in soldiers in a campaign has

often been noted and by this theory is at once explicable—the unusual over-exertion and exposure being sufficient reason. The lightning pains, the girdle sensation, and the various visceral crises, of course, cannot be explained on the theory of exhaustion; but I am of opinion that these are due to the irritation of the nerve roots by the actual syphilitic meningitis, and in support of this is the fact that they are practically always very considerably benefited, if not removed entirely, at least for a time, by the use of salvarsan.

We have seen, then, that this theory accounts most satisfactorily for the pathological anatomical picture in tabes. It accounts just as satisfactorily for the clinical symptoms and explains various peculiarities of the disease otherwise unaccountable. We must recognize with Edinger that *function creates the symptom complex.* Since this theory was advanced by Edinger (*Deutschen Medizinischen Wochenschrift,* 1905, I have endeavoured to add some experimental proof to the great weight of clinical and pathological evidence of its truth. This was impossible until the discovery of the spirochætes and the inoculability of the lower animals, and I wish to express here my very sincere thanks to Dr. R. P. Campbell, of the Montreal General Hospital, for giving me two rabbits which he had inoculated with syphilis. The first, No. 9 of his series, was inoculated in November, 1910, from a chancre which he had produced in another rabbit, No. 5 E; and the other, No. 14, was inoculated in August, 1911, from condylomata and mucous patches, and developed a small chancre in September in which spirochætes were found. The Wassermann reaction was reported positive in the blood of both by Dr. J. C. Meakins. These I exposed to a sort of miniature revolving lighthouse, so that they were constantly subjected to alternating light and darkness, with the idea of causing fatigue of the pupillary reflex to light and consequent atrophy with impairment of function of these neurones, with the formation of the Argyl-Robertson pupil. Judging that if I could prove this exhaustion theory in one instance—that is, prove that one symptom of tabes was caused in this way—we might argue that the other recognized symptoms are produced similarly. In about seven weeks the first rabbit exposed developed a definitely immobile pupil, moderately dilated and inactive to light, and I think, though this is of course difficult to prove, active to accommodation. Unfortunately the rabbit, most inopportunely, developed a pulmonary abscess at this time and soon died, so that I could not feel sure that the pupillary symptoms were produced by pure exhaustion. However, the second

rabbit, in about the same length of time, also developed a similar condition. The normal control rabbit, which has been under the same conditions, has still a perfectly normal reflex action to light, while in the syphilitic one no reaction can be obtained. At times the pupils react to accommodation, but this is difficult to demonstrate.

In no other case among Dr. Campbell's inoculated rabbits which have not been subjected to this intermittent stimulation by light, do the pupils show anything abnormal.

One must conclude, I think, from these experiments that the intermittent stimulation of the pupillary reflex arc by light has produced an exhaustion and loss of function giving rise to a characteristic Argyl-Robertson pupil. And it must be agreed, I think, that this is incontrovertible evidence of the truth of Edinger's dictum: "In tabes, function produces the symptom complex."

In a former paper I showed how, with this explanation of tabes, we have immediately definite indications for the treatment of this disease, and how the results of treatment along these lines give added evidence of the truth of this theory, which is now, I think, established.

Case Reports

BRONCHOSCOPY

THE following is a report of a case of aspiration of a silver tracheotomy cannula and removal by lower bronchoscopy.

Patient, Mrs. F. H., aged thirty-six, Finn. Six years previously had had a tracheotomy performed in Finland for laryngeal diphtheria, since when she had always worn a tracheal tube, and incidentally had become quite expert in its removal and cleansing.

On the afternoon of February 5th, however, upon attempting to withdraw the cannula, the collar became detached, allowing it to recede into the trachea. This was followed by a momentary spasm during which the patient quickly introduced a second tube, of which she had an assortment, and after a brief spell of coughing, accompanied by deep inspiratory movements, the patient suffered no further inconvenience.

Two hours later, when I saw the woman in consultation with Dr. Williamson, of Port Arthur, we found the patient apparently

Rough sketch of metal tracheotomy cannula, showing ragged upper end aspirated into left bronchus.

no worse for her experiment, and indeed, had it not been for the mute evidence of the broken cannula-collar, we might have been tempted to doubt her veracity. Physical examination of the chest was negative.

In virtue of the prime importance of early treatment in such cases, however, I had the patient removed to the R. M. G. Hospital for *x*-ray examination, which was successfully done by Dr. Williamson, the missing cannula being located in the left lower quadrant of the heart shadow.

Under infiltration anæsthesia, the tracheal wound was enlarged and the trachea cocainized with 20 per cent. cocaine. The 7 mm. Jackson bronchoscope was then introduced without difficulty and passed down into the left bronchus.

At about 6 cm. beyond the bifurcation the round, ragged, upper edge of the cannula was discovered firmly wedged in one of the posterior branch bronchi. About one-third of the edge of the tube was already over-lapped by œdematous mucosa, so that, had there been much delay, it is certain great difficulty would have been experienced in seizing and removing the tube. As it was, however, this was quite readily done, although, on account of its size and shape, it was necessary to remove the cannula, forceps, and bronchoscope with one motion.

A fresh tracheal tube was then inserted, and the patient left the hospital the following morning no worse for her unique experience.

JOHN G. HUNT.

Fort William.

CANADIAN ASSOCIATION FOR THE PREVENTION OF TUBERCULOSIS

The twelfth annual meeting of the Canadian Association for the Prevention of Tuberculosis will be held in the Margaret Eaton Hall, Toronto, from May 20th to May 21st, 1912, under the presidency of Dr. J. G. Adami. The following is the programme: Monday, May 20th, reports from Delegates, report of Executive Council, Notification of Phthisis, by Dr. Craig, Appointment of Committees. In the afternoon, President's Address; Modern Public Health Teaching and Practice in Relation to the Control of Tuberculosis, by Dr. Wesbrook; Some Social Aspects of Tuberculosis, by Mrs. Shortt. In the evening, address of welcome by the Mayor; Administrative Control of Tuberculosis, by Dr. H. M. Biggs. On Tuesday, May 21st, the following papers will be read: The Importance of the Pre-Tubercular Stage, by Dr. R. C. Paterson; The Value of the Dispensary to Public Health, by Dr. E. S. Harding; Treatment of Pulmonary Tuberculosis by Means of Graduated Labour, by Dr. Oliver Bruce; Care of the Patient After Leaving the Sanatorium, by Dr. Parfitt. Reports of committees and election of officers will then follow. In the afternoon, the members will be received by the "Heather Club."

Editorial

HEALTH PROBLEMS IN ONTARIO

"HEALTH problems" was the subject of an address recently delivered before the Kingston Medical Association by Dr. E. Ryan. The research work accomplished in the laboratory, the secrets revealed by the microscope, and the consequently wider field of vision open to the medical man of the present day, places the science of medicine on an eminently better footing. The physician no longer is satisfied with diagnosis and treatment; he has come to realize the vast possibilities of preventive medicine—the whole range of the mental, physical, and to a large extent moral life of mankind being now brought within his scope. The time has come, and is now at hand, when Canadians must wake up to the fact that many problems of public health urgently require attention and that it is essential that they be dealt with without further delay. The mortality of infants is much greater than it ought to be. This was also the case in Germany; a commission was appointed to investigate the cause; it was found that the mortality was particularly great among children artificially fed; preventive steps were taken and the death rate has now fallen from eleven to two per cent. Another vital problem is the admission of immigrant undesirables. Hospitals for the insane are overtaxed with such patients, continual cases of stabbing and other crimes perpetrated by these foreign degenerates are before our courts, and our hospitals record case after case from among these same immigrants—undesirable citizens who should never have been allowed to enter the country. What is to be done? To use Dr. Ryan's own words: "What a splendid field is here for the organizing labours of an intelligent commission!" Yet another problem is the disposal of sewage. The water sup-

plies are becoming more and more contaminated. Recent tests of the waters of Lake Ontario seem to indicate that the water of that lake is contaminated throughout. All sewage should be treated artificially, either by filter beds or chemically. Much might still be done in Ontario to cope with tuberculosis. Dr. Ryan spoke of the work done in New York and in the county of Durham, England. Perhaps the most advanced of all movements is that known as the "Edinburgh scheme": sanitaria for patients in the earlier stages have been established, hospitals for the chronic cases, and, in addition, a farm colony for rest and treatment—great importance is attached to the value of the fresh air treatment. Another point to which Dr. Ryan drew attention was the prevention of infectious diseases. Apart from small-pox, probably no disease is treated with sufficient sanitary precaution, and the physician frequently omits to report the existence of such cases.

Dr. Ryan concluded his remarks with the recommendation that a government commission be appointed to investigate these conditions, and that it should submit a full report to parliament. The findings of this commission would indicate the means to be taken in the future.

THE ISLAND PROVINCE

THE fight against tuberculosis is being carried on with success in Prince Edward Island. Improved sanitary conditions, more efficient ventilation in the home, and a better understanding of the general rules of health are the result, says president W. F. Tidmarsh in his address before the Charlottetown branch of the Anti-tuberculosis Society.

A free dispensary is now maintained by voluntary subscription; and the citizens have shown the most generous appreciation of the efforts of the association. Much disappointment has been felt in the attitude of the city council, utter indifference to the work of the society having been shown

by that body. It is hoped, however, that the recently elected council will evince more interest in the campaign against this disease, and will show its appreciation of the work done by practical financial assistance. The dispensary, although primarily intended for the treatment of tuberculosis, receives for treatment other patients: during the past year one hundred and fifteen patients were treated, of whom only thirty-five were tubercular. The association intends, if possible, to continue the work, but it is feared that, unless some financial aid is given by the city council, such a course may become impossible and the association be compelled to confine the treatment given in the dispensary to tubercular diseases.

A civic by-law was passed on December 12th, which provided for the proper inspection of milk. Unfortunately, this law has never been enforced. The law is an extremely important one and its rigid fulfilment should be made compulsory. The necessary steps should also be taken to secure provincial and civic inspection of meat and other food products. Yet another point, to which attention was drawn by President Tidmarsh, is the extreme discomfort suffered by patients who are brought in from country districts for treatment in city hospitals. No provision for such cases is made on the Prince Edward Island railway. If they are unable to sit up, they are placed in the baggage car, exposed to draughts and the rude gaze of the passer-by; if they are able to sit up, they are placed in an ordinary seat in the coach. It is hoped that something may be done to ameliorate these conditions.

MEDICINE IN SOUTH AFRICA

THE South African *Medical Record* of February 24th gives a full account of a discussion of the Public Health Acts Amendment Bill. The Minister of the Interior, in moving the second reading of the bill, stated that the laws, as they existed in the various provinces, were not sufficiently effective in the case of

epidemics, neither were the laws dealing with public health adequate. The position was all the more serious in view of the fact that in South Africa they had to face the possibility of epidemics of such dread diseases as bubonic plague, tuberculosis, small-pox, sleeping sickness, and many others. The government at present was not in a position to bring in a bill which would cover the whole ground. The question had been complicated by the South African Act. Certain powers had been relegated to the provincial councils, and local authorities had been vested with power in regard to public health questions and sanitation. Under the present bill, an officer of health for the whole Union would be appointed and an administrative department would be established; there would be a staff of experts who would confine themselves to the technical side, while the actual administration of public health laws would be in the hands of the Minister of the Interior. The public health of any particular district would be in the care of the local authorities and the government would only interfere in the case of serious dereliction of duty, or in the case of any serious outbreak of disease. Were an epidemic of bubonic plague, sleeping sickness, or small-pox reported, the government would interfere at once.

The bill was strongly objected to by Dr. J. Hewat, of Woodstock, on the following grounds: It was going to remove the medical officers from the various provinces; it was going to replace the advisory board; and it was going to constitute the Minister of the Interior the medical officer, the advisory board, and everything connected with public health. In short, it was going to nullify all that had been accomplished during the past ten years. By the provisions of the bill there would be a medical officer of the Union, medical officers of health, and assistant medical officers of health, who would all report direct to the minister, but who would not work together as a combined body. The result naturally would be confusion. There was no machinery in the bill whereby the medical officers of health could get at the general condition of the health

of the country. The provincial councils were to be absolutely deprived of the public health departments. And what was going to happen to the three hundred district surgeons in the country? The public were beginning to realize that more attention must be paid to public health and that preventive measures against disease were essential. He hoped the minister would realize that a department of public health was absolutely necessary.

Mr. W. D. Baxter, of Cape Town, stated that, under clause 11 of the bill, the minister had power to force the local authorities to act as he saw fit and thus infringe upon the proper rights of the provincial council. Chaos and friction would result, and all power would be concentrated in the hands of the Minister of the Interior. The laws for each province were distinct and different from each other in many ways, and he considered that matters pertaining to each province should be dealt with by the provincial council and not by one single office in Pretoria. The debate was adjourned and we are without further report, but the solution of the difficult problem will be awaited with interest.

DIVISION OF FEES

AT the regular meeting of the Vancouver Medical Association on March 11th, the question of the division of fees between specialist and general practitioner was discussed. The meeting considered: That the payment of a commission by a medical man to any person who might influence patients to apply to him for professional advice or treatment is unethical and unworthy of any member of the medical profession; that a specialist is entitled to receive his regular fee direct from the patient, without reference to the medical man in charge of the case; that, when the regular attendant has assisted the specialist in the diagnosis and treatment of the case, his fee may be added to that of the specialist, or the two accounts may be

rendered separately; that in cases where the specialist is called in to assist in the diagnosis or to operate, but where the the entire management of the case devolves upon the regular attendant, the latter shall send a joint account, or the accounts may be rendered separately; in such cases, the surgeon's fee shall not be less than one-half of the amount he would charge if the case were under his sole management. It was also considered the duty of members of the association to report to the executive any cases of such commission having been paid by a medical man. This decision appears to us to be entirely sound, and we commend it to other societies.

HEADACHE POWDERS

BULLETIN 230 from the laboratory of the inland revenue department contains a report, by Dr. A McGill, the chief analyst, on one hundred and fifty samples of headache powders. These are usually put up in packages of one dozen. Two powders from each package were examined. The duplicates were found to be very similar, but, in a few instances, there was considerable variation in the amount of the potent drug.

In one hundred and eighteen samples acetanilide—antifebrin—was found; it usually appeared alone, but, in a few cases, phenacetin was also present. This latter drug constituted the principal component of twenty-four samples, while eight preparations were found to contain aspirin—acetosalicylic acid, a drug which is not scheduled by the Proprietary, or Patent Medicine, Act.

The drugs contained in the powders are frequently disguised under technical synonyms, which are not understood by the general public. For instance, phenacetin appears under the name para-acetphenetidin or para-oxyethylacetanilide. Or the declaration of the drug is included in such a mass of reading matter that its presence often escapes atten-

tion. Dr. McGill suggests that the employment of commonly accepted names of drugs be made compulsory.

In none of the powders examined did the amount of phenacetin exceed the amount specified—five grains—in section 7 of the Proprietary, or Patent Medicine, Act. Of those containing acetanilide, sixty-two declared the presence of the drug, but the amount contained was in excess of two grains, the maximum stated in the above Act. Twenty-seven contained the drug in small quantities, but did not declare its presence. Eleven contained excessive quantities of the drug, but were protected by bearing a stamp and thus being designated as "old stock"—Circular G. 843. Fifteen contained large quantities of the drug, without declaring its presence, and, consequently, are amenable to the penalties fixed by section 1 of the Patent Medicine Act. Eighty-eight samples of the one hundred and fifty examined make distinct claim to curative powers. Such claims are unwarranted, and should be punishable under the Act.

In one or two cases these headache preparations were found to be put up in the form of lozenges or chocolates. Dr. McGill draws attention to the danger of such a practice. The results of the last examination of preparations of this kind were published in Bulletin 113: the examination was made in June, 1905. Twenty-eight samples out of the thirty examined were then found to contain acetanilide.

It is evident from this report that the Proprietary, or Patent Medicine, Act has had a wholesome effect on the preparation of such powders. Seven samples of "old stock" preparations—that is, powders which were in the hands of the retail dealer when the Act came into force—were examined also. The average amount of acetanilide contained was shown to be over five grains. The danger incurred by the use of large quantities of a heart depressant such as the drug in question is self-evident.

ABUSE OF CONFIDENCE

THERE is an old saying that a man should always tell the truth to his banker and to his physician. A man who lies to his banker is apt to find himself in gaol. The penalty for lying to a physician is not prescribed in the code. A certain amount of confidence in the word of the individual is the basis of all society and the foundation of every day life. But it is not always possible to obtain tangible proof that a statement made is correct. Therefore, unless an individual is notoriously untruthful, or there is other grave reason for doubt, his given word is accepted. This fact is not recognized by the Toronto Street Railway Company, which, by a series of frauds, would seek to shake the very foundations of all social organizations. They would turn the machinery of justice into a jest; they would deceive the medical examiner, and so make it impossible for him to make a correct and just diagnosis; they would make the individual into a cheat, and all this to serve their own ends and make it impossible for a person who has been injured in any way by or through that company to demand just compensation.

One day last October, a man named Burnett came to the surgery of Dr. A. H. Garratt, in Toronto. The man stated that he had been injured through a fall from a street car. He described his sufferings and was treated by Dr. Garratt. Later, Burnett brought a suit against the Toronto Railway Company in which Dr. Garratt gave evidence. Burnett then went into the witness box and stated that he was in the employ of the Toronto Railway Company, and that the whole case was a fraud.

This disgraceful affair was designed to injure the entire medical profession by casting doubt upon the word of the physician involved, and to create a precedent by which any action brought against the Toronto Railway Company at any future date might be annulled. Such an action on the part of any company is almost incredible, and a menace to the entire community.

THE Secretary wishes to call the attention of members to the fact that all subscriptions to THE CANADIAN MEDICAL ASSOCIATION JOURNAL should be sent to Dr. H. B. Small, Ottawa, who is Treasurer of the Association. Members are particularly requested to forward their subscriptions to Dr. Small.

STRIKING evidence of the growth of the demand for hospital facilities was given in the report of the president of the Kootenay Lake General Hospital. The number of patients has increased by fourteen per cent. during the last twelve months, and the accommodation provided in the present building is quite inadequate to meet the demand. A new hospital is soon to be commenced, in which there will be accommodation for sixty beds. The estimated cost is $60,000. The new building is to be placed in that portion of the city park which adjoins the present hospital grounds on the east. When the premier of the province and the minister of agriculture visited Nelson three years ago, the board was given to understand that the provincial government would give an amount equal to any sum that the directors might succeed in obtaining by voluntary subscription, provided that sum did not exceed $40,000. The public has made a most generous response to the appeal of the directors, and the sum of $19,467.35 has been subscribed. In addition to this, the city of Nelson has contributed $15,000. The total amount promised is already $34,467.35, which, together with a like amount from the government, amounts to $68,934.70. It is confidently expected that $80,000 will be finally available.

AN unfortunate event has happened in Dorset, Ontario. Six members of the family of Angus Mackay were affected with scarlet fever and five of them died. A rumour became current that the disease had been propagated from the To-

ronto Western Hospital. It appears that the eldest daughter of the family had entered the hospital a few weeks before as a nurse. She was taken ill and after a few days died. The body was brought home for burial, and out of this fact arose the report that the hospital had been at fault. Upon investigation it was found as usual that the report had no basis in fact. Shortly after the arrival of the nurse she developed tonsilitis. She was attended by Dr. McCullough, the medical superintendent, and he had in consultation with him Dr. J. Price Brown, Dr. Geoffrey Boyd, Dr. F. C. Trebilcock, Dr. Henry A. Beattie, and Dr. John Ferguson. They all agreed that the case was one of pneumonia. It is not often that a hospital has the opportunity of being so completely exonerated.

THE town of Petrolea, Ontario, appears to have enjoyed immunity from any severe outbreaks of disease during the past year. In his report before the Board of Health, Dr. R. S. Macalpine, M.H.O., commented upon the improvement in the milk supply, due to the recent enforcement of the law. He also made some interesting remarks on the eleventh annual meeting of the Canadian Association for the Prevention of Tuberculosis, and enumerated some of the advantages to be gained by the establishment of local sanitoria throughout the country, where the disease might be treated and instruction given as to the best means of prevention. The establishment of such institutions would necessarily involve great expenditure of money, and Dr. Macalpine spoke highly of the liberality of the local government. He also emphasized the work which might be done in public schools to aid in the fight against tuberculosis, by training the physique of the child and by teaching him how to prevent the disease. Another question to which Dr. Macalpine drew the attention of the Board was that of the sanitary disposal of garbage and the necessity of ameliorating the conditions existing in certain localities.

Book Reviews

A Pocket Atlas and Text-book of the Fundus Oculi. Text by C. Lindsay Johnson, M.A., M.D.; drawings by Arthur W. Head, F.Z.S. F. A. Hardy & Company, Chicago.

Mr. Lindsay's object in producing this work was to afford the practitioner of medicine and the medical student a ready means of diagnosing the internal diseases of the eye; and it must be said that he has accomplished his purpose in a high degree. The author devoted the first chapter of his book to the necessary description of the ophthalmoscope and its uses; then briefly reviews the anatomy of the parts involved; and finally takes up in order the various normal and abnormal conditions which occur in the fundus oculi. Accompanying the text are fifty-five admirably coloured drawings by Mr. Head, and a convenient note and drawing book for ophthalmoscopic purposes, also by Mr. Head. The work is well printed and attractive in its pocket-book cover, and altogether makes a very handy, compact manual, which is eminently suited for use by ophthalmoscopic classes.

Recent Methods in Diagnosis and Treatment of Syphilis. (The Wassermann Reaction and Ehrlich's Salvarsan, "606".) By C. H. Browning, M.D., Lecturer on Bacteriology in the University of Glasgow, and Ivy McKenzie, M.D., Director Western Asylums' Research Institute, Glasgow. Octavo, 303 pages. Cloth, $2.50, net. Lea & Febiger, Publishers, Philadelphia and New York, 1912.

The development during the past year in the treatment of syphilis has been so rapid that all but specialists must be bewildered. Nearly all the journals, in every issue, have important articles dealing with a wide range of experience with the new methods. Monographs are appearing constantly, and the results are being summed up in booklets. Accordingly, we hasten to call attention to this work of Drs. Browning and McKenzie from Glasgow. ' The contents of the volume are essentially a record of original research. Although a considerable part of the results have appeared in different form in various journals it is none the less valuable when here gathered together. The introduction is by Professor Muir, and

deals with the general principles underlying the Wassermann reaction and the operation of salvarsan. Without being unduly sceptical, Professor Muir exercises proper caution. The authors enumerate sixteen papers contributed by themselves and their associates, Morton, Gilmour, Chislett, and Cruickshank, to the periodical literature. The labour involved in the preparation of this work must have been immense, and for it the profession will be correspondingly grateful. The book is one for experts, but it will be read with avidity by all who are interested in the treatment of syphilis.

MODERN METHODS IN NURSING. By GEORGIANA J. SANDERS, formerly Superintendent of Nurses at the Massachusetts General Hospital, Boston. 881 pages; 228 illustrations. Cloth, $2.50 net. Philadelphia and London: W. B. Saunders Company. Toronto: The J. F. Hartz Co., Ltd., 1912.

This book of nearly nine hundred pages, as well written as the average text-book in medicine, illustrates very well the importance of this new vocation which has grown up in the last twenty years. Miss Sanders has an unusual equipment for her task by reason of a large experience in England, in Boston, and in Philadelphia, besides a natural talent for writing and for arrangement of material. The introduction covers fifty-eight pages. It might well be printed as a separate book and issued by every hospital as a grave warning to applicants and probationers of the qualifications and responsibilities which are required of them. Nowhere else has the subject received so full and temperate a discussion. This is quite the most complete book on nursing we have seen.

AN INTRODUCTION TO THERAPEUTIC INOCULATION. By D. W. CARMALT JONES, M.A., M.D. The Macmillan Company of Canada, Ltd., Toronto. Price $1.25 net.

The author of this book succeeds in his attempt to make clear the principles which govern therapeutic inoculation. This he does in the first part. In the second part he deals with the treatment of many infections by means of inoculation. The principal source of information was St. Mary's Hospital and the work which is done there. The technique of the method is described in an elaborate appendix. At a time when the subject is receiving so much attention this book is sure to be of interest to laboratory workers and to others who are concerned most about results.

Books Received

The following books have been received, and the courtesy of the publishers in sending them is duly acknowledged. Reviews will be made from time to time of books selected from those which have been received.

THE TREATMENT OF FRACTURES BY MOBILIZATION AND MASSAGE. By JAMES B. MENNELL, M.D., B.C., with an introduction by DR. J. LUCAS-CHAMPIONNIERE. The Macmillan Company of Canada, Ltd., Toronto. Price, $3.50 net.

AN INTRODUCTION TO THERAPEUTIC INOCULATION. By D. W. CARMALT JONES, M.A., M.D. The Macmillan Company of Canada, Ltd., Toronto. Price, $1.25 net.

A POCKET-ATLAS AND TEXT-BOOK OF THE FUNDUS OCULI. Text by C. LINDSAY JOHNSON, M.A., M.D.; drawings by ARTHUR W. HEAD, F.Z.S. F. A. Hardy & Company, Chicago.

PHYSIOLOGY OF THE SEMICIRCULAR CANALS AND THEIR RELATION TO SEA SICKNESS. By JOSEPH BYRNE, A.M., M.D., LL.B. J. T. Dougherty, New York.

ANÆSTHESIA AND ANALGESIA. By J. D. MORTIMER, M.B., F.R.C.S. 276 pages, 29 illustrations. Price, $2.00; D. T. McAinsh & Co., Toronto.

MINOR SURGERY. By L. A. BIDWELL, F.R.C.S. 265 pages, 88 illustrations; price, $2.00. D. T. McAinsh & Co., Toronto.

HEALTH AND MEDICAL INSPECTION OF SCHOOL CHILDREN. By WALTER S. CORNELL, M.D. Illustrated with 200 half-tone and line engravings. F. A. Davis Company, Philadelphia.

FORMULAIRE DES MEDICAMENTS NOUVEAUX, 1912. By H. BOCQUILLON-LIMOISIN. J. B. Bailliére et Fils, Paris.

TRANSACTIONS OF THE AMERICAN SURGICAL ASSOCIATION. Vol. XXIX. Edited by ARCHIBALD MACLAREN, M.D. William J. Dornan, Philadelphia.

Men and Books

By Sir William Osler

X. Gui Patin. One physician we know thoroughly, and one only—Gui Patin, Dean of the Faculty of Medicine, Paris. His ways and works, his inmost thoughts, his children, his wife, his mother-in-law (!), his friends, his enemies—the latter *very well*—his books and pictures, his likes and dislikes, joys and sorrows, all the details of a long and busy life, are disclosed in a series of unique letters written to his intimates between 1630 and 1672. But this is not a biographical note—I wish only to lodge a protest and to express a hope.

Editions of the famous letters are common, from that of Frankfort, 1683, to the three volumes of Réveillé-Parise, 1846—fourteen in all, and all imperfect, many garbled. A unique and priceless contribution, general and medical, to the history of the seventeenth century, "forming," as Triaire says, "a veritable diary improvised day by day, a mordant chronicle of the times by one of the most brilliant, the most alert, the most spirituel and the most satyric of the period." The worst possible luck has dogged all attempts to issue a definitive edition. Formey, of the Berlin Academy, in 1770, conceived the design to issue the correspondence complete with notes, but nothing came of it.

The edition of Réveillé-Parise, the only one of the nineteenth century, while a great improvement upon and much fuller than any other, had many errors, and perhaps deserved the severe handling given to it by Sainte-Beuve. MM. de Montaiglon and Tamisey de la Roque had collected material, collated the letters, and had one volume ready when, in 1895, a fire destroyed every page of their manuscripts. Not a whit discouraged by the ill-success of his predecessors, Dr. Paul Triaire, of Tours, already well-known for his biographical writings, undertook the task, and in 1907 issued one splendid volume containing the letters from 1830 to 1848. As illness overtook him, the work could not be completed, and the death of the accomplished editor has just been announced. It is a sad loss, a calamity in the world of letters.

Now for my protest: It is not often that a Frenchman makes a mistake in matters literary, but there is one Pierre Pic, whom I

would like to shake for the disappointment caused by a wretched abortion which has seen the light under the title of "*Gui Patin, avec 74 portraits ou documents,*" Paris, G. Steinheil, 1911. Pic has the shamefacedness to acknowledge that he does not know much of his subject—"Mais mon bagage à son sujet n'était pas lourd." This is evident. From two old editions which he has picked up he has sorted various extracts from the letters, but he has never even looked into—so he says, and one can well believe him—the edition of Réveillé-Parise, or the delightful first volume of Triaire with the early letters; and he appears to be ignorant of the important collection of letters in the Bibliothèque Nationale. One is not surprised at his judgement—"Gui Patin has been abominably over-rated. He is a bore . . . ." It is a pity for M. Pic's reputation that he had not left him alone. Had he devoted a little appreciative study to his author, he might have come to the conclusion of his great countryman, Fleurens, who saw the *man* through all his faults: "Gui Patin has really written nothing but his 'letters': and these 'letters,' in spite of a boldness of view which is sometimes extreme, in spite of language which is often common, in spite of many errors of judgement, of many prejudices against certain men—these letters are a brilliant expression of a proud and lofty soul, and in them he will live, for there is in them what never dies—style. Gui Patin is the most 'spirituel' doctor who has ever written, unless one includes Rabelais, in whom, however, medicine was hardly more than '*la qualité externe.*'"

But the chief object of this note is to make an appeal, to express a hope, that the Paris Faculty will at once arrange for the completion of M. Triaire's edition. Much of the work has been done, and it should not be difficult to find someone with the necessary qualifications. They owe it to the memory of one of the greatest of their deans. When completed, an English edition should be forthcoming. From one of the old editions a translation has already been made by Dr. Blodgett, of Boston, who, at my request, has withheld it from the press awaiting the completion of Triaire's work.

Res Judicatæ

THE RECOGNITION OF PULMONARY TUBERCULOSIS

THAT tuberculosis is terribly prevalent is a fact all must be willing to admit, but while we may wonder at and accept the figures which mortality statistics, autopsy records, and biological reactions force upon us, do we take our impressions of this prevalence, this omnipresence of tuberculosis, and the idea that a probable biological implantation has become of clinical importance into our daily practice? I do not think we do.

Familiar association with many hundreds of consumptives during the last ten years, and intimate knowledge of the histories and physical conditions of most of these, convince me that a considerable percentage of them could have been saved much illness, and probably assured much longer lives, if this point of view of the great prevalence of tuberculosis and the ever-present possibility of such infection had been in the minds of their physicians. It is probable that through familiarity with a family or an individual the suspicions of the physician are not readily aroused, but it is difficult to explain why, very often, when most obvious suggestive symptoms have arisen, the practitioner should ward off the possibility of a reasonably early diagnosis by lulling the fears of the patient, the family, and himself, and creating a feeling of false security. Many families no doubt resent the imputation of tuberculosis almost as an insult, but there are many, also, to-day awakened by popular education to a lively sense of such a possibility. In either case the criticism for delayed diagnosis will surely come, and often with much justice. As a kindness to the patient the day of concealment should belong absolutely to the past. Frankness is the only proper course. At the same time that fears are lulled, the examination, both natural and necessary at such a time, is either not done, or else is done in such a casual manner that it is valueless; the patient is frequently reassured and fears are calmed until finally the diagnosis is forced upon both medical adviser and patient, by which time, very possibly, the patient has consulted another physician or sent his own sputum to a laboratory for examination. Why should the bleeding point in the throat be so frequently found to explain a hæmorrhage which should surely point to most careful inquiry, examination, and prolonged observation in case nothing is

found, or to consultation if the practitioner has any reason to doubt the refinements of his methods of physical examination? Why should there be such slight attention paid to the sputum examination of a continued bronchitis, even though the patient himself suggests and even implores that his expectoration be examined; or a case muscularly weak, pale, and possibly with dyspeptic symptoms be so lightly diagnosed as dyspepsia, anæmia, or nervous prostration; or persistent, but variable pain in neck and shoulders be regarded as rheumatism; or a husky-voiced larynx receive such continued and vigorous treatment without a realization of the causes other than local for such a condition? Why also should a slight rise of temperature in the neighbourhood of one degree elevation, of possibly daily recurrence, be of such little moment to many practitioners and so seldom sought? Do the harsh coughs so frequently recurrent in some children, without other symptoms of bronchitis, but associated with fever when the patient has taken cold, and the almost invariable presence of cervical nodes, put us on guard as they should do, even without further examination?

In most instances an open mind and a careful inquiry, with due regard to certain symptoms, in some cases definite, in others indefinite, but just what we have a right to expect from a disease which early manifests itself by the symptoms of a toxæmia mainly affecting the neuromuscular system, will obtain a diagnosis much earlier than can be possible from the methods of physical examination commonly in vogue. Many histories can be adduced to support this view. The diagnosis should, in any case, be fairly determined without waiting for marked physical signs or bacilli in sputum. In addition, thermometry, with frequent observations made by the patient himself, after due instruction, to replace the casual office temperature observation that is not necessarily of any value; the repeated use of the same scales; and the repeated examination of sputum, with no attention whatever paid to a casual negative report, will give good ground for warning or reassurance. It is interesting to note that for 1909, with an estimated ten thousand cases in the province of Ontario, only twenty-two hundred and fifty sputum examinations were done by the Provincial Board of Health Laboratories—and sixteen hundred of these gave negative results. The various hospital laboratories no doubt serve many practitioners, but with the addition of examinations made there and in private laboratories the total number of specimens examined is all too small for the number of patients who should be suspected. The examinations in city laboratories at this time are negligible.

Physical examination of the chest yields such discordant results, varying with the training and care of the examiner, that for reasonably early diagnosis it is, as frequently carried out, quite as likely to lead astray as to be of service. There are of course cases which are obvious, and others so definite that with relatively slight examination the veriest tyro may make a diagnosis, and it is always desirable to have these recognized in order to safeguard others, though the diagnosis may be of little value to the individual concerned. But many moderately advanced cases require care in examination and many incipients extreme care, to say nothing of the probable and doubtful cases. The need of most careful physical examinations is further emphasized by the sensitiveness and discrepancies of the several tuberculin tests which have promised so much, but which, while specific, cannot be regarded necessarily as informative of a clinical tuberculosis without being interpreted along with the clinical and historical data accurately obtained. These tests, while not used as extensively as they might well be, can readily be misinterpreted and prove a source of error, though an error usually in the right direction. Simple, sound, routine examination of the various organs of the body consistently followed will pick up cases otherwise easily overlooked. In the last six months, in a small practice, two cases of cæcal tuberculosis were found which had been overlooked, one by an eminent internist, especially renowned in tuberculosis, and the other by a successful family physician. In neither of these cases was the pulmonary disease relatively of moment, and it is a coincidence that neither case came from Canada.

It is so momentous for the patient that the disease be diagnosed early, that physical examination is of the utmost importance, but the examination to be of value must be a skilled one. Good technique is essential and also a considerable experience of relative values. In all the methods employed the greatest care must be taken to eliminate error, which can so readily creep into any of the procedures used. Both leisure and quiet are essential in difficult cases, and, even after the greatest care has been used, the examiner must often be in doubt, and can only recommend a repetition of the examination after a period of observation. Methods of chest examination ordinarily seen are, in the majority of cases, too crude really to detect early cases or to warrant an opinion excluding tuberculosis. This opinion is, I believe, confirmed by the experience of all men who are engaged in sanatorium work or in practice in resorts for tuberculosis. I may say that I rarely have a truly

incipient case referred to me, and that seldom do I fail to find evidence of tuberculosis in other areas than that designated as the site of trouble, and that I rarely have a strictly unilateral case under observation. There may be reasons for this in the nature of cases referred to me, but my more recent experience with a clientèle drawn from the reasonably well-to-do is approximately the same as my earlier experience with patients drawn mainly from a labouring and artisan class. It happens, however, that one man will send a series of relatively early cases, whereas another will send only advanced ones, both, possibly, equally promptly after recognition, so that it is fair to think that cases come to both that are recognizable at an early stage and that difference in method or point of view is responsible for the different stages when the diagnosis is made.

My own experience caused me much chagrin, though it was salutary. After my year's service at the Toronto General Hospital in '95, I went to London. I carried with me that excellent opinion of myself and of my training that ex-house surgeons of that hospital were wont to have, but I soon found that with the stethoscope as well as in other matters of medical education and training, I had much to learn, and a good deal to unlearn. As a matter of fact, I was hopelessly at sea on the chest, both in accuracy of observation and in interpretation, and since then I have been forced to realize that it is only consistent watchfulness that can prevent error or oversight in chest work. While the opportunities for clinical training in general are to-day much better than in the early '90's, it is probable that many young physicians since then have begun practice without more accurate ideas of chest work than I had at the end of the house surgeon's year, and that they have not had the same opportunity to have their errors corrected. It is not then surprising that many cases possible of recognition go undiagnosed until a relatively advanced stage is reached. In the early '90's we saw none but far advanced cases in the wards, and, since these were greatly used for clinical instruction, it was usual for the dramatic changes to be emphasized, and the recognition of cavity became the acme of diagnosis for students. I recollect one or two cases only in the out-patient's department in which early adventitious sounds were demonstrated.

I am told that the opportunity for teaching students tuberculosis in the wards in Toronto is now even less than it was fifteen years ago. With my present conception of the diagnosis of early tuberculosis, I am impressed with the utter impossibility, under the facilities that obtain, of teaching this subject in either wards or

outdoor departments, even though the latter clinic is a specialized one. Both leisure and quiet are absolutely necessary, a grouping of cases to emphasize various small points is highly desirable to teach prognosis as well as diagnosis, and the dignity of a special clinic with all proper facilities is needed, both from the point of view of teaching and in order to impress the student with the need of realizing this important subject. With the many dramatic subjects that claim his attention, that student is an exception who will see for himself the necessity of time spent upon this highly important, but undramatic detail. It is inevitable that every teacher will urge the importance of the subject in which he is interested, and time does not give opportunity for great attention to all. If greater importance, however, were attached to the teaching of this highly important but modest subject, internal medicine in general would greatly benefit through the greater refinement in method that the student would have to learn. The recognition and realization of the importance of trifling changes in percussion note or breath sounds are of infinitely more importance for the student's future clientèle than his ability to diagnose a heaving thoracic aneurism or a palpable pyloric cancer.

It is a matter of profound regret to one interested in this subject that the splendid new hospital about to replace the old General makes no provision for two observation wards where suspected cases of tuberculosis might be sent in for diagnosis, and where other cases might be grouped to illustrate various phases of the disease. The recently issued annual report of this hospital shows that there were seventy-six cases of medical tuberculosis under treatment during the year. If these cases were grouped they would be much more available for broad clinical instruction. In a ward especially designed for their accommodation they would serve admirably to illustrate the present hygienic methods of prevention of infection and treatment, and their presence would be invaluable as an object lesson with the view of lessening the phthisiophobia so common in physicians and nurses as well as in the laity. A special dispensary clinic is even more essential. It should be, for hygienic reasons, in a building of its own, complete in all details, in order to facilitate diagnosis, treatment, and teaching. At the same time, it should be a great factor in the broad sociological movement already inaugurated. Such a clinic, for public service as well as for teaching, should ideally be part of the hospital, but for practical reasons it would naturally have to be intimately identified with the municipal health department. This clinical building would emphasize the

importance of the subject to the layman and physician alike, and would become, most probably, the centre around which all work, both medical and social, would develop. Containing efficient *x*-ray and laryngological rooms, and also a well-equipped laboratory, which would offer facilities for the use of Caulfeild's interesting serological methods for prognosis and diagnosis, and also for the easy use of tuberculin in diagnosis, it would soon come to be used by the practitioners of the city as an important arm in diagnosis. In a word, it would become an inspiration to more thorough work in general. Such dispensaries should be developed in all centres of considerable size.

With the development of social work and the familiarizing of the public with the presence of tuberculosis amongst them, emphasized by a dignified dispensary, a more common-sense view about tuberculosis than exists at present will develop in most municipalities. There will come to be a rational fear of evil resulting from carelessness and a reassurance when it is recognized that care is taken. It is much to be desired that such a rational idea should speedily be developed by both employer and employee in the interest of the wage-earner to replace the present insane fear. No factor need be greater in the development of this sane point of view on the part of the public than the family physician. Every family he has to deal with should gradually be educated to a realization of the ubiquity and insidiousness of tuberculosis, the methods of prevention, the premonitory symptoms, and the necessity of early medical advice if such suggestive symptoms should arise. The physician should be invariably, as indeed he often is, a family supervisor for prevention as well as treatment of illness. Some increased remuneration will no doubt ensue, though, as a lantern bearer, the knowledge of the brightened glow of his lantern will for a time be his main compensation.

The development of sanatoria in easily accessible, instead of relatively inaccessible places, and the excellent results obtained in them by consistent supervision, has done much to take attention from the real value of climatic change and to develop still further the idea of home treatment in both physician and patient. If the attending physician would thoroughly familiarize himself with the details of supervision, and enforce them, little could be said against home treatment, as it is very often successfully carried out. But the fact that symptoms seem, in early stages, so often relatively unimportant as compared with the familiar acute types of disease, detracts from their real importance in the minds of both physician

and patient, and the former is disinclined to emphasize restriction when he should, and the latter to make concession. At home the patient is also deprived of the education and support that he gains in a sanatorium from the experience of others, and these are of material help to him in addition to the training of sanatorium régime.

What is known as "the class system" of treatment with patients living at home gives most excellent results, but this is the consequence of specialized supervision. Recoverable cases have a much better chance, as a rule, in sanatoria. Much to be deprecated, however, is the sending away of patients for change of climate and surroundings where there will be no adequate medical supervision, unless they have already had at least a short period of sanatorium training. Many a bad result drifts to the sanatorium from such an experience, but too late. Physicians are often inclined to be critical of sanatorium results because they do not fully realize the limitation of the terms used for the purpose of record when a patient is discharged, and the results possibly do not come within their conception of the terms. Too much is also often expected when neither the anatomical nor physiological condition present warrants the desired result. A prolonged sanatorium treatment is by no means necessary in all types of cases. A tuberculosis is sometimes of subsidiary importance in those cases in which it is engrafted upon other organic or functional diseases of long standing which are of more importance in treatment. Quite inactive or arrested cases are also sometimes sent to sanatoria, which can safely be returned home after a short period of observation.

The error of gravest importance and one most frequently made in the handling of pulmonary tuberculosis by the relatively inexperienced is the failure to appreciate the full value of rest and to maintain it until even slight activity has quite subsided and the resistance has been considerably increased. Valuable as exercise is after this point has been reached, the too early adoption of it is a distinct loss rather than a gain. The exploitation of exercise as a form of treatment by those scientifically familiar with its effects, in whose hands it may be perfectly safe, is likely to encourage the inexperienced to use it unwisely, and most practitioners, in this country at least, have not yet learned to emphasize rest.

I have been told, when discussing with my friends some of the points referred to here, that I know very little about the difficulties that beset the practitioner in reaching a diagnosis, that cases that are referred to me are already labelled (unfortunately too

well in many instances) and that no onus of responsibility rests with me in making the selection, that consequently my views on this matter are one-sided, that I am in the position of the pathologist, so to speak, who has the last laugh at the clinician. I am very willing to admit the practitioner's great difficulty, the many calls upon his time, the services often so poorly remunerated, the many differential points he must consider in the variety of diseases he is compelled to deal with, how often he is right rather than wrong, at any rate in the more acute type of illnesses, and that his familiarity with prevalent types of infection may help him to exclude possibilities which the consultant does not always have in mind. Also that the patient himself is very often to blame, either because of the tardiness of his awakening through the insidious nature of this disease, with which he can long continue to work, or because he may have refused to heed the warnings which his physican has given. I am also quite willing to acknowledge that it is inevitable that any specialism must mean some, even considerable, limitation of one's horizon, both practically and theoretically. Detached as one becomes from the educational opportunities of general medicine, in this special field it is, almost more than in any other, highly desirable that there should previously have been a sound education in internal medicine. We cannot gain detail without some compensating sacrifice, but even so, it is, I think, still possible to keep an open mind, and in doubtful cases be able without prejudice to give a fair opinion.

But, after all, such contentions merely beg the question. The disease is there, and if sought, can be found much earlier than is the rule at present. The experience of the Berlin dispensaries illustrates this, as in one year for every case voluntarily coming to the dispensaries another was found, when looked for, in the household from which that patient came. Bulstrode, in his report to the Local Government Board, quotes Latham as expressing current medical opinion when he says that "the early diagnosis of pulmonary consumption is a question of supreme importance, perhaps the most important which the physician has to face."

The point of view is, in my opinion, the most important thing in helping us as physicians to meet this problem more efficiently. Our efficiency and value depend upon standards derived from our ideals. The point of view, a stethoscope of really good make, and that admirable silent critic of our work, a blue skin pencil, so little used, will make for efficiency and interest where now there may be a lack of both. No Heaven-sent sign will come to help us to diagnose tuberculosis that will be independent of sound clinical investigation.

If we are to do our duty, we must not supinely wait until the diagnosis declares itself. There is little dramatic about tuberculosis except the awakening, after which all is tragic, not necessarily in suffering as much as in the realization of lost opportunity and possibility.

It has not been my wish or intention to make out a case for the consultant or specialist, committed within the broad field of internal medicine to the care of a tuberculous clientèle, but rather to emphasize the view that the family practitioners form the bulwark of protection for the individuals of the community against the inroads of this disease, which is probably implanted in a majority at an early period of life. With this end in view, I have attempted to examine fairly the methods we bring to our daily work, and if they are found wanting, which is a matter for individual personal decision, they should be improved within ourselves, or, if this is not found practicable, help from without must be obtained, if our duty is to be done to those who trust us.

Gravenhurst C. D. P.

Sir James Grant, K.C.M.G., recently attended the centenary of the Academy of Natural Sciences, Philadelphia, as the representative of the Royal Society of Canada. The event was celebrated by many delegates from scientific centres of the world, joined by a large attendance of leading American scientists from the chief institutions of the republic.

Retrospect of Medicine

Human and Bovine Tuberculosis

INASMUCH as an editorial was published, October, 1911, in The Canadian Medical Association Journal upon the final results of the British Royal Tuberculosis Commission, it would seem of interest to have the summary and criticism of this report made by Dr. Stabarzt B. Möllers, who occupies Koch's old position in the Royal Institute for Infectious Diseases, Berlin. These have appeared in the *Berl. Kl. Wochenschr.*, 1911, No. 47, and more fully in the *Zeitzschrift fur Tuberkulose*, Bd. XVIII, Heft 2.

During the days in which I had the pleasure and profit of seeing the enormous amount of material at their disposal (in Berlin), and the facilities whereby detail work had been and was being done, I fully realized the attitude felt by these workers, especially over many of the articles adverse to Koch and his work, which appeared in the daily press after the final report of the English commission. Dr. Möllers was kind enough to go over the details of his criticism with me: this was at the time in the form of a galley proof.

Dr. Möllers' treatment of the report of the English commission opens with one of Koch's original statements made in London in 1901; namely, that the human and bovine strains are distinct from one another, and that severe infections due to the bovine bacillus occur but comparatively rarely. It is further pointed out that the English commission based their conclusions solely upon their own results, and failed to mention other investigations along similar lines. A number of these other investigations are included in Dr. Möllers' article in which mention is made of the review of the English Commission's Interim Reports by H. Kossel, in the *Deutsche Med. Wochenschr.*, 1908, No. 5.

The various points of the report are translated and throughout the attitude has been one of sincere regard towards the amount of work done, and only when the conclusions refute, or are said to refute, Koch's statements are the data of the English commission and other investigations brought to close criticism.

In the commission's table of one hundred and eight cases of human tuberculosis, Möllers points out that only forty-two cases of primary pulmonary tuberculosis are given in explanation of Koch's statement at Washington, 1908, that pulmonary tubercu-

losis, which chiefly is the cause of the spread and mortality of the human race, is caused not by the bovine, but by the human bacillus. Of these forty-two cases there were fourteen, which were determined by post mortem material, while twenty-eight cases were sputum investigations, upon which later Koch had laid special stress, as the spread of the disease took place chiefly through the sputum of the phthisiker. In contrast to the commission's forty-two, there are cited Dieterlen's (Berlin) results with fifty cases, Kitasato's (Japan) on fifty-two; Kossel's (Heidelberg) on forty-six; the author's (Berlin) on fifty-one, and the results of the health department of the city of New York on two hundred and ninety-one, in which the sputum was investigated culturally. Of the forty-two cases of the English commission, but two were found to be due to the bovine bacillus; both ocurring in the lot investigated through the sputum. The history of both cases is closely criticized and mention made of the fact that the last four and six months of life, respectively, went without investigation, and that no post mortem was obtained. The inference probably was that there might have been a mixed infection, which might have shown up towards or at the end. Möllers' remarks that even this percentage, namely, two out of forty-two, cannot alter the truth of Koch's statement, and proceeds by stating that, including the forty-two cases of the English commission, there are seven hundred and nine similarly investigated cases in the literature.* Out of this number are the two cases of the English commission, and one doubtful reported by Jong-Stuurmann, due to the bovine bacillus, while in one case Kossel found a mixed infection of both bovine and human strains.

Twenty-nine cases of the one hundred and eight were instances of abdominal tuberculosis, of which thirteen were occasioned by human, fourteen by bovine, and two by both human and bovine strains. With this data the English commission supported their conclusion that a considerable number of cases of tuberculosis in childhood must be ascribed to the bovine bacillus. This is criticized in that Möllers states that with these data the conclusions are justified, but that the number is too small, without further work, to guarantee that these relations obtain in general. In defence of this criticism Weber's results are adduced (*Tub. Arb.* a. d. K. G. A. 1910, Heft 10), which, including thirteen cases of the English commission, totalled sixty-six cases of tuberculosis in children, and six of adults due to the bovine bacillus. To this assemblage of Weber's but few have been added subsequently. Here it is further to be

*Robert Koch, *Stiftung*, Heft. 1, and *Deutsche Med. Wochenschr*, 1911, No. 43.

remembered that to a great extent the material had been selected from cases suspected to be due to bovine infection, and that only through routine and unselected material, supported by post mortem, can the true relation between the bovine and human strains be established.

Such investigations were undertaken by Gaffky in the Berliner Institute for Infectious Diseases a year ago and continued by Rothe, whereby four hundred children were investigated at post mortem. By inoculation of guinea pigs with mesenteric and cervical glands seventy-eight cases (19·5 per cent.) were found to be tuberculous, in which the agent in 96·15 per cent. of the tuberculous, and 18·75 per cent. of all the investigated cases was found to be confined to the human bacillus; in 3 per cent. of the tuberculous and ·75 per cent. of all cases was a bovine infection demonstrated. This investigation showed, further, that the portal of entry was chiefly by way of the respiratory organs. These results of Gaffky and Rothe support entirely Koch's statement that for childhood the significance of the bovine bacillus is a very minor one in comparison with the danger that the human threatens. Thus the findings of the English commission, on account of the method of their selection of and the smallness of the number of investigated cases, are not in a position to refute Koch's view.

Attention is drawn to the work done upon twenty cases of lupus, in which but three cases could be typically labelled, two strains being human and one bovine. The remaining seventeen are found to divide themselves into two groups, one of eight and the other of nine cases, each group showing peculiarities. Koch's work on forty cases of lupus is mentioned but not detailed in either publication. This is, however, implied for the next publication of the Robert Koch-Stiftung.

The remaining points of the English reports are well summarized before the answers to the three questions, with which the commission had to concern itself, are taken up.

Regarding the second question, namely, whether animal and man can be reciprocally infected, Möllers finds the conception of Koch and the English commission to be in agreement.

The third question is, under which conditions, if ever, does the transfer of infection from animal to man take place, and which conditions favour or hinder such transference? This important answer is again dealt with in considerable detail, particularly that part which concludes that by the means of milk a considerable number of cases is occasioned in childhood. The number of the

commission, that is, thirty-nine cases of tuberculosis of abdominal organs and cervical glands, is not sufficient to offset the results of others, particularly those of Gaffky and Rothe, in which the proportion between bovine and human showed marked difference from those of the commission.

If the relation between human and bovine, as found by the commission, represents the truth for all, then this high percentage of bovine infection should have a marked significance in adult life, which is not found to be the case. (This argument must be based to a great extent upon one's conception as to whether exaccerbations in later life leading to clinical tuberculosis are true autoinfections, autoinfections induced by reinfection from without, or true reinfections from without.)

The further argument of the commission that whatever the animal source of tuberculosis for adolescence and adults may be, there can be no doubt that a considerable number of cases of tuberculosis in children are occasioned by bovine infection, and that these are occasioned by the ingestion of infected tuberculous material, which conditions advise energetic regulations guarding against the danger of transference of bovine bacilli from tuberculous cows (whether the lesion is in the udder or internal organs) through the means of the milk, and that these regulations must eliminate the possibility of milk supply from such cows. This argument, with its consequent enactments, Möllers finds in harmony with Koch's attitude, but exception is taken again to the extent of the danger. This extent is outlined from the results of the investigations instigated by Koch from 1905 to April, 1909. This comprised the data obtained among six hundred and twenty-eight people, including two hundred and eighty-four children, who had drunk, in the main for long periods of time, milk from one hundred and thirteen cows reported with udder tuberculosis. From this material it was definitely ascertained that raw milk or its products had been used in sixty-nine cases of udder tuberculosis by three hundred and sixty individuals, of whom one hundred and fifty-one were children. Of these, but one child in two families showed cervical gland involvement. In these two infants the course of the disease was mild, which is again contrasted with the usually fatal termination of the infection, where this is due to the human bacillus.

The concluding paragraphs state that the teaching of our memorable master, Robert Koch, namely, that the cause of human and animal tuberculosis is distinct, and that in the fight against tuberculosis the chief aim must be towards preventing the transfer-

ence from man to man, and further that these teachings have been overthrown in no way by the results of the English Royal Commission, as one might imagine from many of the articles which have appeared in the daily press. The investigation results of the commission only strengthen the opinion of the German workers of the truth of Koch's conceptions.

A more recent article by Park and Krumwiede (*Journal of Med. Research*, xxv, 2, 131) gives, together with Möllers' criticism, such complete and exhaustive data and results on this aspect of tuberculosis, that the relative importance of the human and bovine types of tubercle bacilli in the different forms of human tuberculosis seem to be finally settled.

A. H. C.

A MARKED decrease in the number of cases of scarlet fever in Toronto during the month of March is shown as compared with 1911. In March last year there were four hundred and forty-one cases, this year there have been one hundred and sixty-three. Twelve typhoid cases were reported during March this year, while fifty-eight occurred during the same month in 1911. Only two cases of measles have been reported during March this year, as compared with eighty-seven during the same month last year. No cases of tuberculosis have been reported this year, but seventy-two were reported in March last year. On the other hand, diphtheria shows a considerable increase, one hundred and fifty-seven cases being reported this year as compared with one hundred and one during the same month last year.

Obituary

Dr. Munger, of Rodney, died March 14th, in his eighty-second year. Dr. Munger was a native of New Brunswick, but went to Western Ontario soon after he graduated. He was closely identified with the town of Rodney for many years. A few years ago Dr. Munger retired from active practice as a physician and went into the drug business, which he conducted until five weeks before his death.

Dr. J. D. Thorburn died at Guelph on March 26th, after an operation for appendicitis. Dr. Thorburn, who was the son of the late Dr. Thorburn, of Toronto, was a graduate of Toronto and afterwards took post-graduate courses in Vienna and Edinburgh. He was a member of the College of Physicians and Surgeons, and was on the staff of several of the Toronto hospitals. His practice as a specialist in diseases of the nose, ear, eye, and throat was a large one. Dr. Thorburn is survived by his widow, a daughter of Sir William Meredith, and four children.

Dr. E. Pearson James, of Galt, was found dead in his office on March 27th. Death was due to heart disease. Dr. James graduated in Toronto in 1902, and was a member of the Ontario College of Physicians and Surgeons. At the time of his death he was thirty-three years of age.

Dr. J. Horace Crepault died March 25th, in his sixty-third year, after a long illness. Dr. Crépault was born at St. Louis de Kamouraska and graduated at Laval University in 1870. He practised at Saint Pascal and in Montreal for many years.

Peterborough lost one of its most prominent physicians in the death of Dr. R. P. Boucher, which took place on March 16th. Dr. Boucher was for some years a member of the provincial board of health and was president of the medical society. He also served on the board of education. The deceased took an active part in all social organizations and was particularly interested in athletics: he was president both of the Peterborough Curling Club and the Peterborough Lawn Bowling Club. He was the son of Judge R. M.

Boucher. He studied medicine at Victoria College, Toronto, after which he spent some time at Belleview Hospital, New York. Dr. Boucher was sixty-four years of age.

DR. R. N. LUTON died at London, Ontario, on March 18th. He was sixty years of age, and had practised for many years in Grand Rapids, Michigan.

DR. J. W. WRIGHT, of Picton, died February 29th, in the fifty-sixth year of his age.

DR. GEORGE F. RYMER died at Fort Resolution, N.W.T. Dr. Rymer was a medical missionary at the above post for many years.

DR. F. S. YORSTON, of Truro, died in Florida.

DR. ULRIC LAFONTAINE died at Manchester, N.H., in the twenty-seventh year of his age. Dr. Lafontaine was a graduate of Laval University, and was the nephew of Judge Ulric Lafontaine.

DR. FINLOW ALEXANDER died at the Hotel Dieu, Montreal, March 28th, in the seventy-ninth year of his age. Dr. Alexander was born in Devonshire, England. After studying medicine he came to Canada, where he practised for ten years. He then left the medical profession and became a minister of the Anglican Church. In 1894 Dr. Alexander entered the Roman Catholic Church, and the latter part of his life has been spent in strict retirement in Montreal.

News

A bill has been introduced in the Ontario legislature, which provides that no hospital receiving provincial aid shall refuse to admit a patient suffering from tubercular disease; that all private hospitals must be licensed and must pay a fee of $5 a year; and that public hospitals shall not charge a municipality or an employer more than one dollar a day for any patient treated in that hospital.

A SERIOUS outbreak of small-pox has occurred in St. Agapit. The disease first made its appearance in the local convent. A medical officer was at once called in and the case diagnosed as small-pox. The health authorities, however, were not notified and no precautions were taken to prevent the spread of the disease. As a result, fifteen days later, thirty cases of small-pox had developed in the neighbouring community. The matter has been taken up by the provincial board of health. Strange to say, the doctor who neglected to report the initial case of the disease has since been appointed sanitary inspector for St. Agapit.

A CASE of small-pox is reported from Meductic. The young man affected had just returned from Regina. A case of the disease has also occurred in Sarnia.

A CASE of leprosy has occurred in Toronto. The victim is a Chinese boy of thirteen years of age, who has been in this country for three months only. He was an inmate of the Toronto General Hospital for some weeks, but has since been deported to the leper colony of Tracadie, in New Brunswick.

SMALL-POX is reported from Moose Jaw, half-a-dozen cases having been removed to the isolation hospital. Two cases have also occurred in Toronto.

OVER fifty cases of scarlet fever are reported from St. John's.

WHOOPING cough is very prevalent in Amherst. Many young children have had bad attacks of this disease.

THE new general hospital at Port Alberni is to receive a special government grant of $5,000.

THE nurses at Portage la Prairie Hospital have been successfully inoculated against typhoid fever, giving immunity for one year.

FREE eye, ear, and nose clinics are now held every Tuesday and Friday at the General Hospital, Regina. A free clinic in medical and surgical diseases is held daily, except Sunday and legal holidays, from 2 to 3 o'clock p.m. A nominal admission fee of ten cents is charged; also a fee of ten cents for medicines and prescriptions.

A SLIGHT epidemic of small-pox is reported from Fernie, B.C.

FIFTEEN cases of typhoid have been reported in Bordeaux. An analysis of the water is to be made and a filtration plant established.

DR. THOMAS MCCRAE has been appointed professor of medicine in the Jefferson Medical College of Philadelphia. This professorship has been held for many years by Dr. James C. Wilson, who has recently resigned. Dr. McCrae is a Canadian by birth and a graduate of Toronto University. He has been connected with the hospital and teaching faculty of Johns Hopkins University for the last sixteen years.

THE *Scottish Medical and Surgical Journal* has amalgamated with the *Edinburgh Journal.*

A NEW hospital will shortly be erected in Edmonton. It is to be situated in the grounds of the University of Alberta. The plans for the new building were discussed at a recent meeting of the hospital board.

AN outbreak of small-pox is reported from Courtwright. Fourteen cases are under quarantine at St. Clair, Michigan, just across the river. All precautions are being taken and every one in Courtwright is being vaccinated.

DR. G. H. COWAN has been appointed medical health officer of Napanee.

A NEW hospital for Orillia is under consideration. It is to be erected on the site of the present hospital and will accommodate fifty patients. The estimated cost is about $50,000.

DAVIDSON is to have a hospital. The cost of the building is estimated at about $20,000. It is proposed to lease the hospital for a term of three years to the Victorian Order of Nurses.

SEVERAL cases of small-pox have occurred in Saskatoon, Moose Jaw, and in a farming settlement ten miles north of Suffield, Alberta. Cases of this disease are also reported from Joliette, and St. Henry of Levis, Que.

THE Vancouver Medical Association held a clinical meeting at the General Hospital on February 27th. Dr. Grenfell, of Labrador, was entertained at the University Club on March 2nd. The regular meeting of the association took place March 11th.

TWENTY-SEVEN cases of typhoid have occurred in Port Hope. The epidemic is thought to be due to the water.

A SERIOUS outbreak of measles is reported from Upper Island Cove, Newfoundland. As many as one hundred and fifty cases have occurred in the village, and there have been several deaths.

COMPETITIVE examinations for the purpose of selecting ten district sanitary inspectors will be held in June at the Montreal office of the provincial board of health. Candidates must be physicians holding diplomas of public health. With the object of training such men, special courses in public health have been organized at McGill and Laval universities.

A COMMODIOUS new hospital is in course of erection at Mount Coquitlam, B.C. The hospital, when completed, will consist of a series of buildings, one of which is now nearing completion. This building will accommodate six hundred male patients, and, it is expected, will be ready for occupation the end of July.

THE city of Toronto has been divided into fourteen health districts, each of which will be in charge of an inspector under the supervision of Dr. Hastings.

DR. W. H. T. PEAKE, of Transcona, has been appointed coroner in the province of Manitoba.

DR. W. R. GORDON was fined $50 and costs for practising medicine at Duck Lake without a license.

THE new wing of the Toronto Isolation Hospital will accommodate one hundred and twenty-five beds. The opening is to take place on the first of May.

THE provincial government of British Columbia has granted the sum of $10,000 to the West Coast General Hospital.

THE establishment of a new hospital in the mining district at Porcupine is under consideration. It is reported that a fund of $10,000 has already been set aside for this purpose.

BOWMANVILLE is to have a hospital and a most generous response has been made to the appeal for funds. It is to be situated on the South Park property, which has been given by Mr. J. W. Alexander, of Bowmanville.

A HOSPITAL is to be established at Weyburn, Saskatchewan, at a cost of $110,000. The site has already been secured.

THE fourth International Congress of Hygiene will meet in Buffalo in August, 1913. Emeritus Professor Eliot, of Harvard University, is to be president, and Sir James Grant honorary vice-president.

Canadian Literature

ORIGINAL COMMUNICATIONS

The Canadian Journal of Medicine and Surgery, April, 1912:

Physical and Mental Training in the Treatment of Nervous Diseases	B. E. McKenzie.
The Treatment of Appendicitis other than Operative	G. T. McKeough.
Trade or Occupation Dermatitis	D. King Smith.

Le Journal de Médecine et de Chirurgie, March, 1912:

De l'ensiegnement de l'ophthalmologie en Allemagne	G. Morin.

Le Montréal Médical, March, 1912:

Polynévrites alcooliques	Dr. Déjerine.
Les nouvelles méthodes pour le diagnostic étiologique des gros foies	Dr. Castaigne.
Régles à suivre pour établir le régime des albumineuiques	M. Springer.

The Canada Lancet, March, 1912:

Ulcer of the Stomach and Duodenum . W. J. Macdonald.
Imperforated Rectum . . . . John Ferguson.
Appendectomy on Shipboard . . . E. Bryceson.

Public Health Journal, March, 1912:

Physiological Observations on Men's Wearing Apparatus for Saving Life in Mines David Fraser Harris.
Some Early Garden Talks . . . Rachel E. Todd
Progress in Canada in Biological Methods of Sewage Disposal During the Last Twenty Years . . . . . Willis Chipman
Necessity for Preservation of Food Products by Cold . . . . . P. H. Bryce.
Some Recent Advances in Medical Inspection . . . . . Mrs. N. C. Smillie.
Hygiene Laboratories in Military Camps Major H. W. Jacques.
The Control of a Scarlet Fever Epidemic and Its Difficulties . . . . . T. A. Whitelaw.
Pertinent Repetition: An Education Requirement . . . . . Walter S. Cornell.

Western Canada Medical Journal, March, 1912:

The Technique of Ileo-Sigmoidastomy . Ernest A. Hall.
Elevation of Temperature—An Early and Often Enduring Symptom of Hyperthyroidism . . . . . Heinrich Stern.
Ships' Surgeons and Medical Inspection of Immigrants . . . . . J. D. Pagé.

Dominion Medical Monthly, April, 1912

The Crime of the Century. . . . . A. C. E.
Methods of Diagnosis of the Nature of Glandular Enlargements at the Root of the Neck . . . . . O. C. Gruner.

Medical Societies

MONTREAL MEDICO-CHIRURGICAL SOCIETY

THE eleventh regular meeting of the society was held March 1st, 1912, Dr. J. M. Elder, president, in the chair.

PAPER: The programme consisted of an address on "Inflammatory Cysts and Cancer of the Breast," by Dr. Oskar Klotz, Professor of Pathology in the University of Pittsburg.

DISCUSSION:

Dr. G. E. Armstrong: I would like to congratulate Dr. Klotz upon the excellence of his paper. I suppose there is nothing that is exercising the profession to-day more than the question of carcinoma, particularly its cause. I do not know that there is any subject studied so thoroughly and so widely, and by so many trained men, as this very subject, and still when we approach it directly we feel that very little has been added to our knowledge of the subject, that is, to make us more able to deal with it in a satisfactory way. The theories put forth are all very interesting, and a good deal can be said about them all. The side that appeals to the clinician very largely is that it is due to, or follows, irritation. It follows a recurring irritation of a mild character, and I think that something else occurs, and that is, the cells that are changed into cancer cells must first be injured. It seems to me that if I can define it at all it is a recurring or repeated mild irritation of a damaged cell: I think it is Keen who has said that there is no case of carcinoma of the skin known that did not develop in injured tissue, and I think it is coming to be felt by operators that there is an injury in most instances deciding the locus for the commencement of that growth. In cancer of the stomach the earlier we get the case the more it appears evident that the carcinoma would appear

to start in some lesion of the stomach wall, very often an ulcer. And in one case where I removed the pylorus, benign ulcers and an ulcer in which the carcinoma was developing in the early stage were found side by side. As to the energy of the cells and the potential energy remaining when they cease to perform their function, the theory does not appeal to me so strongly. After the functional activity has ceased there is a surplus of energy which shows itself in the development of these new growths. I think Dr. Adami thought at one time that that had a good deal to do with it and wrote an article on the habit of growth. That may be so, but at the same time I thought that the metastases were against it being a habit of growth. The question is, I think, still, as Dr. Klotz puts it, that at the bedside our powers are to be expended in the early recognition of the disease, while it can be removed wholly, and before any metastases have occurred, and also in the removal of those conditions which have been alluded to as precancerous, or conditions in which a carcinoma is likely to develop, lesions of the stomach walls, lesions of the lips, and in certain cases, perhaps, of the tongue.

Dr. F. J. Shepherd: I should like to congratulate Dr. Klotz on the valuable paper he has given us. I have come to the same conclusion, that in the majority of cases there has been some irritation and inflammation preceding the cancer. Years ago, chimney sweep's cancer of the scrotum was a common occurrence, but this cancer was abolished by Act of Parliament when sweeps were forbidden to go into chimneys. In India there is a well recognized cancer of the abdomen caused by the irritation produced by charcoal braziers which they apply to their stomachs. With regard to cysts of the breast, whenever I suspect a cyst I make an exploratory puncture with the needle, and if the fluid comes away clear I leave it alone, but if bloody fluid comes away I recommend operation at once, especially in those over thirty-five years of age. It is safe to take every tumour out of the breast after this age.

Dr. E. W. Archibald: I think I do not venture too much when on behalf of the younger men present I rise to congratulate Dr. Klotz on this able address. We who were his comrades are particularly pleased to find him come back a known man, and we are particularly pleased with the ability of the address which he has given us. With regard to what Dr. Koltz has said, I was interested in one point in particular, and that was the passing reference to the work in his laboratory along the newer lines, of the growth of tissue *in vitro*. While in New York, I paid a visit to the Rockefeller

Institute, and was fortunate enough to see Carrel and his assistants at work upon their experiments in this line. At the time, the composition of the fluids in which the tissues were grown was, we understood, of a most particular nature, and the conditions to be fulfilled quite exacting. When I hear Dr. Klotz say that he has grown tissue of a great variety in such solutions as Locke's and Ringer's, I feel that that must represent a step in advance.

Concerning his remarks about the early diagnosis of cancer of the breast, Dr. Klotz is clearly to be congratulated upon securing one of the earliest known cancers in the specimen to which he referred which measured only one-half cm. It is really a find, and I can remember no other specimen mentioned in the literature of so early a growth, except, perhaps, that of Henser, in the stomach. Henser's examination of that specimen would also seem to show that the Ribbert theory of primary fibrous stroma overgrowth and secondary epithelial growth was wrong, and that it was more often primarily in the epithelial tissue that the neoplasm originates. The early diagnosis of cancer of the breast must be always an extremely difficult one. There is a large number of early cases in which the clinician expects the pathologist to give him an answer, yes or no; and such cases are extremely difficult, especially in the border-line cases. The old criterion has yet to stand, and I should like to make this consist simply in the one point of invasion of the basement membrane by the growing epithelium. It is extremely difficult to advance our knowledge along these lines because of the fact that the pathological diagnosis in the doubtful cases must remain dubious until after the course in the patient makes the matter clear. And so often the removal of the growth with permanent cure leaves the matter still in doubt. In passing I might raise a small protest against the current use of frozen sections for the examination of cases in which there is any doubt.

Dr. A. E. Garrow: In rising to express my appreciation of Dr. Klotz's paper, I should like to ask one or two questions which to my mind are of great clinical interest. The microphotographs which Dr. Klotz has shown remind me of a specimen which Professor Ashoff exhibited to his laboratory workers some eight years ago. The breast had been removed by Professor Braun and the histological diagnosis of fibro-cystic disease had been made. Some months later metastases developed, and a more careful examination of the slides revealed a small area of malignant growth. I should like to know if the specimens shown here to-night depicting non-malignant and malignant growth were obtained from the same breast.

Secondly, I should like to ask Dr. Klotz if he has seen malignant cystic disease of the breast bilateral. The so-called interstitial mastitis is frequently bilateral and is not likely to be mistaken for malignant disease, but when limited to one breast, it is apparent from Dr. Klotz's studies that an absolute diagnosis can only be made after an exhaustive examination of numerous sections.

Dr. W. W. Chipman: I was in Pittsburgh some three days ago, and saw Dr. Klotz at work in his laboratory, and I would merely like to say that I was very much impressed with the quality of the work which he is carrying out there. In a position which at the beginning was rather difficult, he has succeeded very wonderfully in unifying and in drawing together the work of several large hospitals. One or two points of the paper to-night stand out conspicuously. The first point is that the tendency of the paper is to show that the progress of our knowledge is towards simplicity, that after all there is a great mystery of cell life, but the mystery associated with the conditions of cell life are largely being cleared up. Practically Dr. Klotz has told us that cells will grow if two things are supplied to them, namely, moisture and warmth. I saw the other day an instance in a German paper where an observer took early embryos, in the case of mice and rats, and simply minced up these early embryos and introduced this mince into the peritoneal cavity of the adult with the result of the formation of a teratoid tumour in the peritoneal cavity. This shows that under these conditions even when the early cells are severely injured, certainly they were finely separated, yet these cells grew in the peritoneal cavity. I feel again that we are much indebted to Dr. Klotz for this very interesting address.

Dr. Fraser B. Gurd: I am delighted to hear Dr. Klotz classify in this simple way tumours or lumps of the breast, according to a system that can group these masses as 1, 2, 3, and 4, in which there is a relationship between the various pictures histologically and the various tumours presented macroscopically and clinically. The tumours which are classified as the adeno-papillo-cystomata or the tumours of the third group, are extremely interesting. Tumours of this kind are those which are difficult to diagnose; they are a class fairly well represented, but inasmuch as a certain percentage of tumours which for the most part present that type do demonstrate malignant qualities, it is extremely difficult in an individual case to make a definite diagnosis. I feel that the element of trauma in determining the malignant habits of growth in these tumours, as suggested by Ribbert, is of more importance than Dr. Klotz believes

it to be. For my own use I have termed tumours of both these classes potentially malignant, and I believe that the cells have developed the power of growing when allowed to escape beyond their basement membrane through injury or irritation. I term these tumours potentially malignant, and as such have made a custom of reporting them, allowing the burden of proof to fall upon the clinician.

Dr. L. J. Rhea: I have been very much interested in many things that Dr. Klotz has said. One thing in particular impresses me. We are placing the cells of the body more on a matter of fact basis and taking away from them the old idea that there is something supernatural about them; that they cannot grow and cannot multiply unless they are in the body and at a given place in the body. The recent work done in Dr. Klotz's laboratory on the growth of tissue in media tends to change our conception of cells as a whole. The question of the relation of cysts of the breast to cancer is another important point that Dr. Klotz has referred to. Cysts of the breast by many have simply been looked upon as accidental formations, in so far as their epithelial lining is concerned; that is, the epithelial lining plays no essential part in them. I believe that not only the interstitial tissues of the breast, but the lining of these cysts are both important. I know of no lesion that is more difficult for the pathologist to make a differential diagnosis between malignant and non-malignant than the papillomata of the breast. In cysts of the breast where there is macroscopic hæmorrhage in the cyst, when called upon to express an opinion at the time of the operation, I have made it a rule to call these tumours potentially malignant and have advised that the breast be completely removed. This holds good not only for the type of cyst cancer, but also in those papillary forms where finger-like processes grow into the cyst. In breasts which show a number of tumours it is a rule in our laboratory that all these masses shall be examined, because some of them may not show malignant change while the last one may, and unless one examine them all he is scarcely in a position to state whether or not one is dealing with a malignant or a non-malignant tumour. Another thing that Dr. Klotz referred to is the question of what the clinician expects of the pathologist when only small bits of tissue are sent to him for hasty examination. I have recently gone to the operations myself when a question of malignancy or non-malignancy was to be differentiated between at the time of operation, so I can see where the tissue is taken from, and besides this, one always gets a larger piece for examination when one is there and asks for it than when one is not.

Dr. Oskar Klotz: I heartily agree with Dr. Rhea, that in examining breasts suspected of malignancy, every part of the organ must be gone over carefully and fair sized portions of tissue removed for examination. It is most difficult for the pathologist to gain a proper understanding of diseased processes in small portions of tissue sent to the laboratory with insufficient data. If there are any nodular or aberrant looking masses in the breast, each must be examined and examined thoroughly.

In my discussion of the reaction of cells to stimuli, I have attempted to measure their activity in terms of available energy. The character of tumour cells, I view as an alteration in the manner in which cells use their energy. If you consider the various cells of our body from a physiological point of view, you gauge it by the nature of the work which it performs. When analyzed more closely, this work is directly dependent upon the available energy of its nourishment. Not alone does the amount of energy brought to the cell alter its work, but the character of this nourishment plays a very important part. Just that ability which a cell displays in utilizing its nourishment in one way or another, I indicate in terms of energy.

We have had some interesting results in observing the growth of the beating heart *in vitro*. Here we have found that the cells are mainly occupied in gaining sufficient nourishment and energy for their multiplication, and that they apparently have little energy left for carrying out their function. The newly developed heart cells do not beat.

The small cancer, which I mentioned in my paper, was a remarkable one for its size. It has excited the interest of several laboratories and it appears to be one of the earliest tumours observed. The case occurred in the wife of one of the surgeons and its early stage was recognized only on account of the acute interest of both parties.

In cases of bilateral cystic mastitis, it is possible that a malignant condition may occur on both sides, but we have had no experience with such a condition. In the majority of instances, although the cystic disease is probably present in both breasts, tumour commonly arises on one side. For the intermediate type of tumour in which an accurate diagnosis of malignancy cannot be made I have no name to suggest.

HURON MEDICAL ASSOCIATION

THE Huron Medical Association met at Wingham, March 13th. The meeting was an interesting one, being marked by the celebration of the jubilee of the oldest practitioner in the county, Dr. J. E. Tamlyn, of Wingham. Dr. Tamlyn has now been in the medical profession for fifty years. Unfortunately, owing to an accident which he suffered a short time ago, Dr. Tamlyn was unable to be present at the meeting. The members, therefore, visited Dr. Tamlyn at his residence and presented him with an address as a tribute to the work accomplished during his professional career and a proof of the affectionate regard and high esteem in which he is held by those of his *confreres* with whom he has laboured for so many years.

OTTAWA MEDICAL SOCIETY

AT a meeting of the Ottawa Medical Society on February 10th, Dr. Howard Fox gave a lantern demonstration of the various forms of cutaneous syphilis. He then discussed some of the advantages and disadvantages of salvarsan in the treatment of the disease. Dr. Fox considered the intravenous method of administration to be the better one. Indeed, like the majority of physicians in New York, he had practically given up the painful and disagreeable method of intramuscular injection.

If properly performed, there should be no local disturbance from an intravenous injection except possibly the formation of harmless nodules in the vein, which generally disappear in a short time. It was decidedly preferable to introduce the needle through the skin instead of cutting down upon the vein, as in the latter case a compromising scar was left. In giving the injection it was necessary to watch the needle carefully to avoid puncturing the vein a second time and to allow some of the fluid to infiltrate the tissues. The escape of a few drops of salvarsan was never followed, in Dr. Fox's experience, by any sloughing or serious effects. It was always necessary to be ready to withdraw the needle at once in case the patient complained of a sharp, stinging pain. This was always the best indication that the fluid was not running properly in the veins. On this account it was absolutely wrong to attempt an intravenous injection under a general anæsthetic. Other indica-

tions that the injection was not being properly given were the appearance of a lump about the point of the needle and the warning from the assistant that the fluid was not running from the reservoir.

In all of his cases Dr. Fox had used the simple modification of the gravity apparatus reported by him in conjunction with Dr. Trimble in the *Medical Record*, March 11th, 1911. He dispensed entirely with salt solution and used sterile distilled water for making the necessary dilution. For a long time he had allowed the patients to go home immediately after the intravenous injection. He had never seen any ill effects whatever resulting from this practice.

CAPE BRETON MEDICAL ASSOCIATION

A MEETING was held in Sydney on March 16th, with the purpose of forming a clinical society composed of the medical men of that city. The chair was occupied by Dr. J. K. McLeod. It has been found difficult for doctors residing in other parts of the country to attend meetings of the Cape Breton Medical Association, held in Sydney. Clinical societies are to be formed, therefore, in the following centres: North Sydney, Glace Bay, and Sydney. These societies will hold regular meetings, but will not interfere with the work of the association.

NOVA SCOTIA MEDICAL SOCIETY

THE annual meeting of the Nova Scotia Medical Society will be held at Truro, July 3rd to July 4th. At this meeting the question of affiliation with the Canadian Medical Association will be considered.

SOUTH WATERLOO MEDICAL ASSOCIATION

A MEETING of the South Waterloo Medical Association took place on April 3rd. The following officers were elected: President, Dr. C. R. Cumming; vice-president, Dr. McEwen; secretary, Dr. Buchanan; treasurer, Dr. Wardlaw.

OTTAWA MEDICO-CHIRURGICAL SOCIETY

THE annual meeting of the Ottawa Medico-Chirurgical Society was held on March 30th, 1912. The officers elected were: Honorary president, Sir James Grant; president, Dr. J. D. Courtenay; first vice-president, Dr. J. R. O'Brien; second vice-president, Dr. J. F. Argue; secretary, Dr. T. W. C. Mohr; treasurer, Dr. A. S. McElroy; librarian, Dr. Charles Preston; curator, Dr. W. S. Lyman; council: Drs. Brown, Cousens, Small, Gibson, I. G. Smith.

SHALL *water closet*, a term so acceptable to civilized man that it has been welcomed to the vocabularies of almost all modern languages, give way to *toilet*? Surely physicians who carry the principles of asepticism into the practice of speech and abhor impurities in their mother tongue, may still accomplish something by making a stand against the squeamishness of female patients and nurses upon whose lips the offender is oftenest heard. The last straw in my own tolerance came the other day in the shape of a circular issued by a State Board of Health over the signature of its secretary, a physician, in whose virile mind a spade is usually that and nothing else. This was the shocking clause: "Plenty of running water, soap, convenient *toilets* to receive the dejecta from the patients." A water closet, night stool, bed-pan, urinal, privy, dejection—for the new word seems to connote all these things—are not and never can be a *toilet* by any stretch of metonymy. Time was, and not so long ago, when one might speak of a lady as being at her toilet without risk of ambiguity. Now the word is apparently tabooed except when used in a mealy-mouthed attempt to æstheticize an uncompromising act of nature.

> "Immodest words admit of no defence
> For want of decency is want of sense."

But there is nothing more immodest than false modesty, and the offence against decency is aggravated a hundredfold when in addition violence is done to the genius of our English tongue. When Pope wrote:

> "The merchant from the exchange returns in peace
> And the long labours of the toilet cease,"

there was no thought in the poet's mind of protracted travail at stool, which interpretation, if we are not careful, may one day be read into the couplet.—B. C. A. in *Albany Medical Annals*